HIGHLIGHTS

REVISION NO. 33 Jun 01/10

Pages which have been revised are outlined below, together with the Highlights of the Revision

CH/SE/SU C PAGES	REASON FOR CHANGE	EFFECTIVITY
CHAPTER 79		
L.E.P. 1- 2	Revised to Reflect this revision indicating new,revised, and/or deleted pages	
79-00-00 301	Minor additions and amplification	

CHAPTER 79

OIL

LIST OF EFFECTIVE PAGES

N, R or D indicates pages which are New, Revised or Deleted respectively
Remove and insert the affected pages and complete the Record of Revisions and the Record of Temporary Revisions as necessary

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OF TEMP.			
REVISION			
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CHAPTER 79

OIL

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GENERAL- DESCRIPTION AND OPERATION

1. General

The lubrication system is independent from the other engine systems. The oil contained in the oil tank is sent by a lubrication pump to the seven engine bearings and the gearbox. After lubrication of the various components, the oil is recovered by five scavenge pumps.
The oil returns to the tank through a chip detector, a filter element and a fuel/oil heat exchanger.

2. Lubrication System Components (Ref. Fig. 001)

The lubrication system comprises five sub-sustems :
- The supply system
- The scavenge system
- The pressurizing air system
- The ventilation system
- The bearing seal drainage system.

NOTE : Appropriate lines and fitting are made of fire proof materials.

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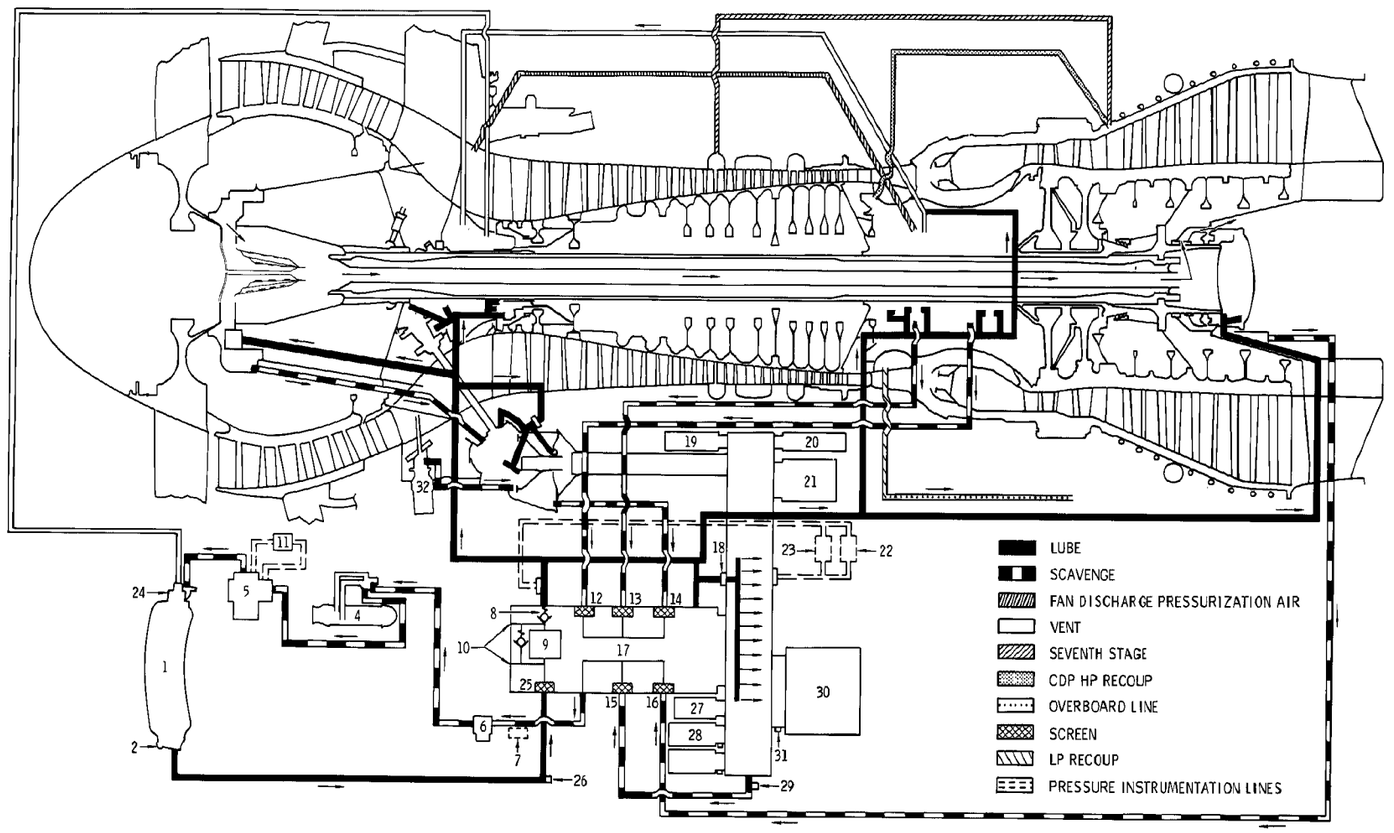

PRESSURIZATION
PRESSURIZATION 12 — 1 — 2 PRESSURIZATION
B, C TO VENT 11 — 3 OIL TANK VENT N1 SENSOR (ELEC)
B SUMP PRESSURE PRESSURIZATION 10 — 4 PRESSURIZATION
OIL SUPPLY PRESSURIZATION 9 — 5 N1 SENSOR (MECH)
PRESSURIZATION 8 — 7 — 6
SCAVENGE
NO. 3 SEAL DRAIN OBD
FAN FRAME
AFT LOOKING FORWARD

SUMP VENT
HPRC 10 — 1 — 2 CUSTOMER BLEED
B SUMP PRESSURE 9 — 3 CUSTOMER BLEED
LPRC OIL SUPPLY 8 — 4 CUSTOMER BLEED
PLRC C SCAVENGE 7 — 6 — 5 HPRC
LPRC & OVERBOARD DRAIN
B SCAVENGE
COMP REAR FRAME
AFT LOOKING FRAME

12 — 1 — 2
11 — 3
10 — 4
9 — 5
SCAVENGE 8 — 7 — 6 OIL SUPPLY
TURBINE FRAME
AFT LOOKING FORWARD

LEGEND:

1. OIL TANK
2. OIL TANK DRAIN
3. DELETED
4. FUEL OIL HT. EXCHR.
5. SCAVENGE OIL FILTER
6. MAGNETIC CHIP DETECTOR
7. SCAVENGE OIL SENSOR
8. ANTI STATIC LEAK VALVE (CRACKS @ 2.5 TO 6 PSID)
9. SUPPLY FILTER
10. SUPPLY FILTERΔP TAPS
11. SCAVENGE FILTERΔP SWITCH
12. C SCAVENGE (IN)
13. B SCAVENGE (IN)
14. TGB SCAVENGE (IN)
15. AGB SCAVENGE (IN)
16. D SCAVENGE (IN)
17. LUBE & SCAVENGE PUMP
18. AGB OIL RESTRICTOR
19. FUEL CONTROL
20. FUEL PUMP
21. STARTER
22. OIL PRESSURE XMTR
23. OIL PRESSURE SW
24. OIL TANK PRESSURE VALVE (7-11 PSID)
25. INLET SCREEN
26. OIL SUPPLY TEMPERATURE
27. AC GEN (N2 SENSOR)
28. HYD. PUMPS (2)
29. AGB DRAIN
30. IDGS
31. DRAIN (TYP 6 PLACES)
32. N1 SENSOR IN STRUT 5 ROTATED 32° CW

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Lubrication System Schematic
Figure 001

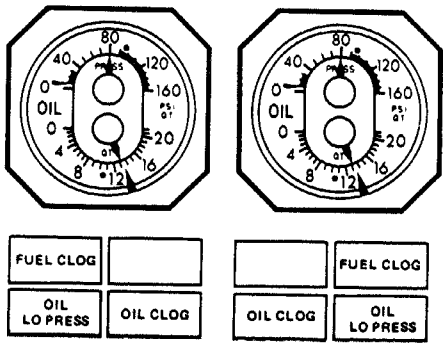
R EFFECTIVITY: 001-100,

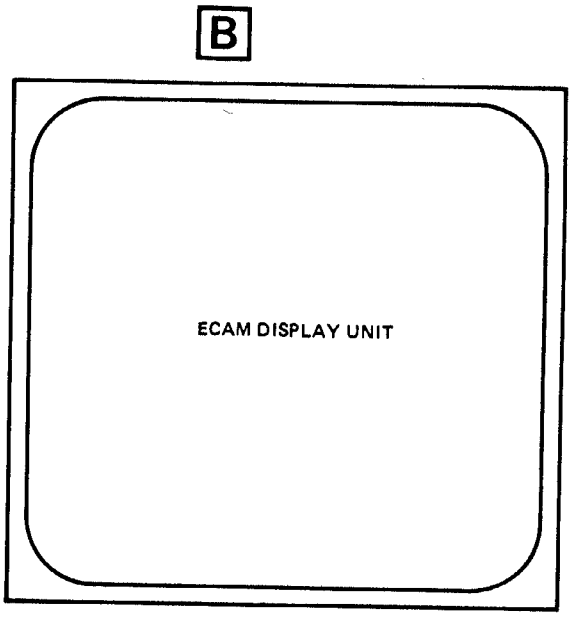
PIA

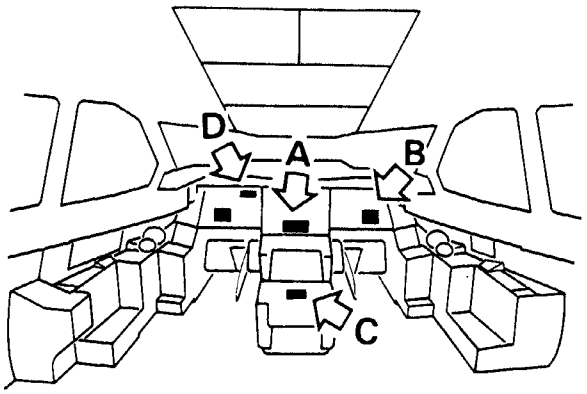
3. Oil Servicing
   To permit servicing, 2 normally wirelocked drain ports are provided.
   - a gearbox plug
   - a tank plug

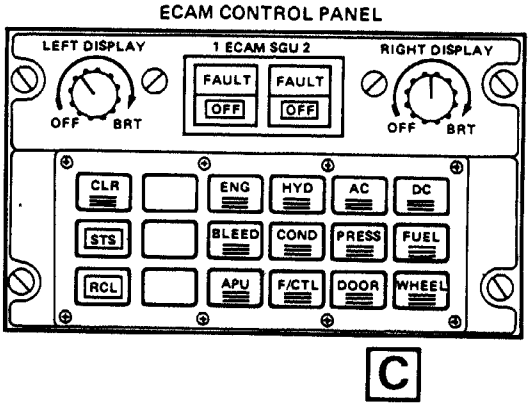
4. Component Location Indicators
   (Ref. Fig. 002)

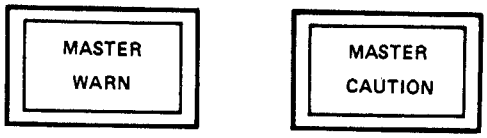
5. Electrical Supply
   (Ref. Fig. 003)











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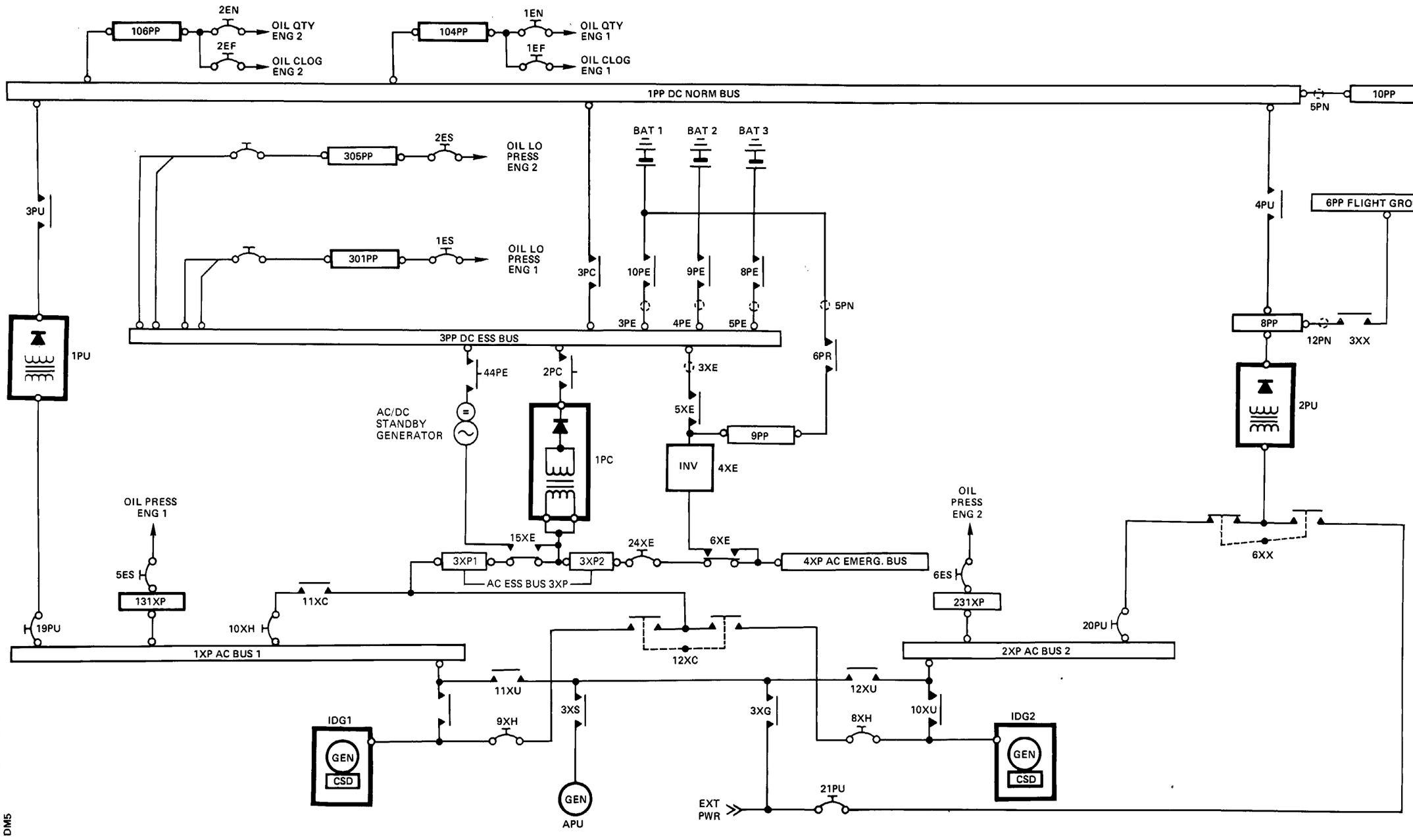
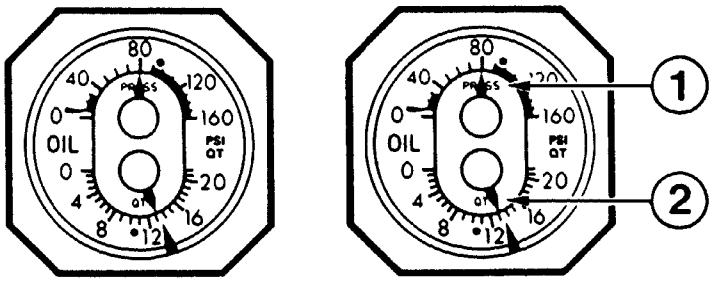
Component Locations - Indicators
Figure 002



ENG1/ENG2 Oil System-Electrical System.
Figure 003

6. Control and Indicating
   (Ref. Fig. 004)
   (Ref. Fig. 005)
   (Ref. Fig. 006)
   (Ref. Fig. 007)



1 - OIL PRESSURE INDICATOR

INDICATES OIL PRESSURE OF CORRESPONDING ENGINE
RED LINE INDICATES MINIMUM OIL PRESSURE

2 - OIL QUANTITY INDICATOR

INDICATES ACTUAL USABLE OIL QUANTITY "0" CORRESPONDS TO 4 QUARTS IN THE ENGINE OIL TANK
A WHITE BUG ALLOWS OIL CONSUMPTION OF THE CORRESPONDING ENGINE TO BE MONITORED

BM5 79 00 00 0 LNMO - 14 - 08
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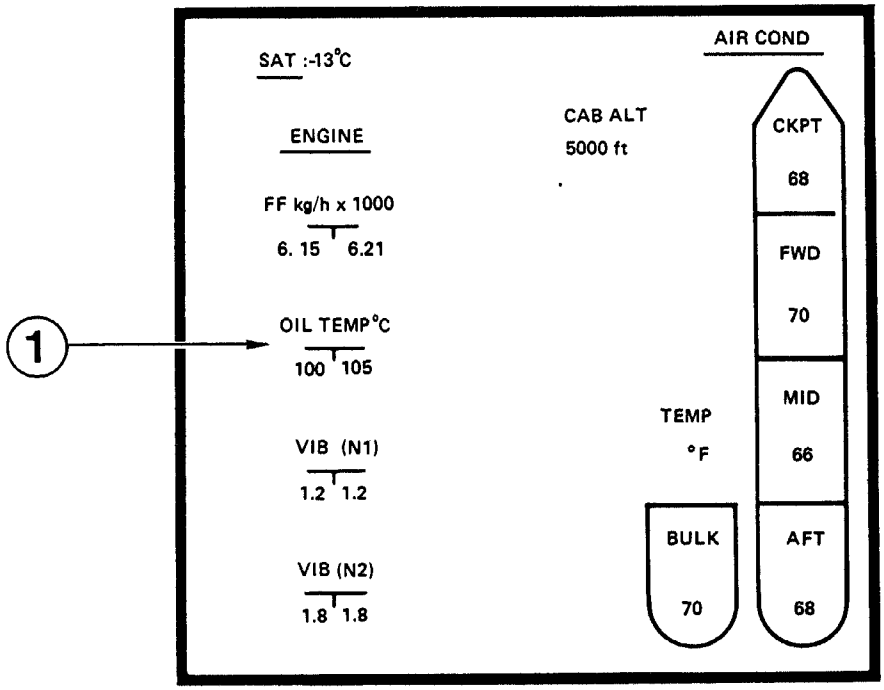
Oil Quantity and Oil Pressure Indicators
Figure 004



CRUISE PAGE

1 - OIL TEMPERATURE (G)
FLASHES WHEN t° ≥ 160° C
(A) WHEN t° ≥ 175° C

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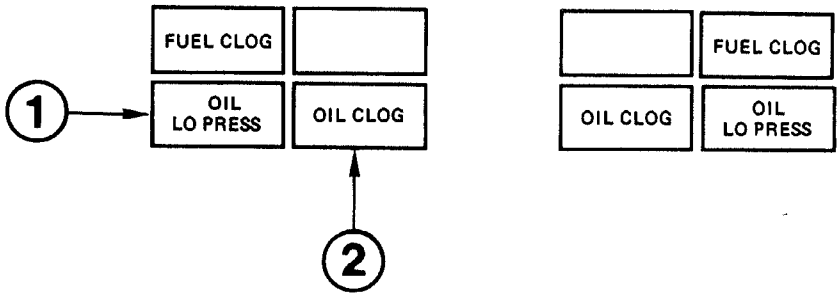
Oil Temperature Indication
Figure 005



1 - OIL LO PRESS WARNING LIGHT RED
INHIBITED WHEN CORRESPONDING HP FUEL VALVE LEVER AT OFF.
COMES ON IF OIL PRESSURE LESS THAN 10 PSI.WITH ENGINE RUNNING
ACCOMPANIED BY MASTER WARN RED LIGHT AND
CONTINUOUS REPETITIVE CHIME.

2 - OIL CLOG WARNING LIGHT (AMBER)
COMES ON IF OIL FILTER DIFFERENTIAL PRESSURE EXCEEDS 30 PSI ALONG
WITH AMBER LIGHT ON MASTER CAUTION AND SINGLE CHIME
ADVISORY PAGE APPEARS ON RIGHT ECAM DISPLAY

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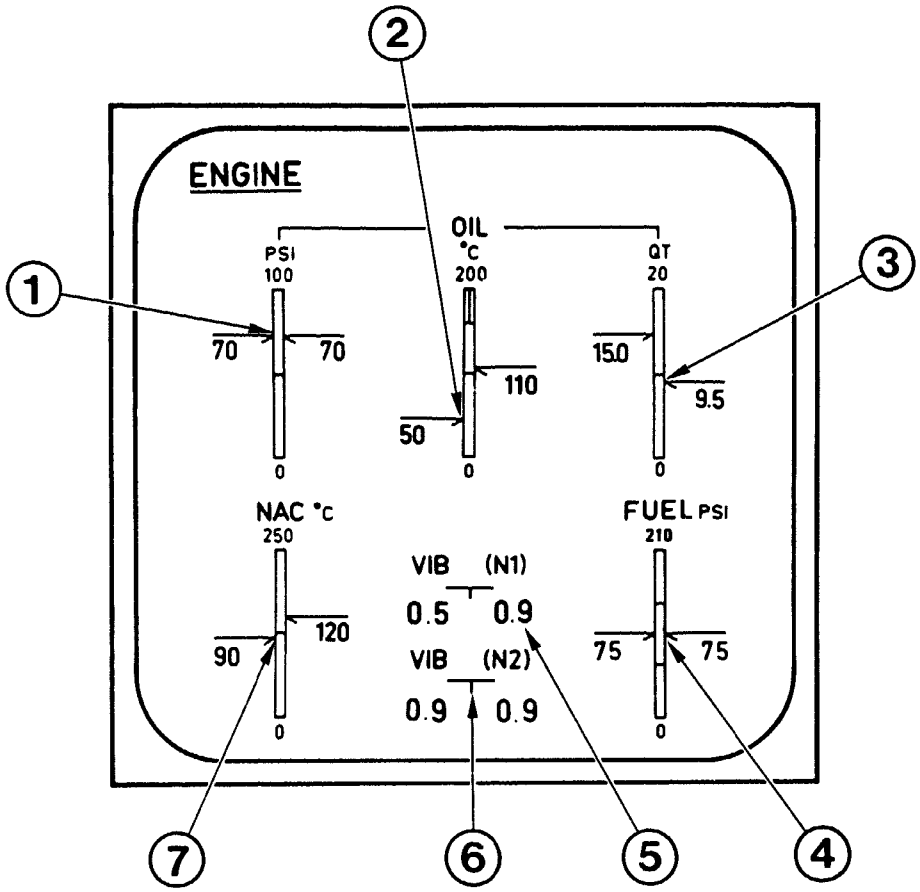
Oil Low PRESS and Oil CLOG Warning Light
Figure 006



ADVISORY

1 - OIL PRESSURE (G)
FLASHES WHEN P ≥ 90 PSI or P ≤ 20 PSI
(R) WHEN P ≤ 10 PSI

2 - OIL TEMPERATURE (G)
FLASHES WHEN t ≥ 160° C
(A) WHEN t ≥ 175° C

3 - OIL QUANTITY (G)
FLASHES WHEN QUANTITY ≤ 2 QTS
(CORRESPONDS TO 6 QUARTS IN THE OIL TANK)

4 - FUEL PRESSURE (G)
FLASHES WHEN PRESSURE ≤ 50 PSI

5 - ENGINE VIBRATION (N1) (G)
FLASHES WHEN VIBRATION ≥ 3 UNITS

6 - ENGINE VIBRATION (N2) (G)
FLASHES WHEN VIBRATION ≥ 5 UNITS

7 - NACELLE TEMPERATURE (G)
FLASHES WHEN t ≥ 185° C + TAT
NOT DISPLAYED DURING STARTING SEQUENCE
(REPLACED BY BLEED PRESSURE INDICATION)

BM5 79 00 00 0 LPMO - 14 - 09
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CRT System Display
Figure 007

1. General

A. This procedure describes post maintenance servicing which is to be performed after routine scheduled and non-scheduled maintenance of the lubrication system.

B. This procedure describes the steps for servicing the engine system with a different approved brand. This is not a post maintenance servicing.
WARNING : SYNTHETIC LUBRICANTS USED IN AIRCRAFT TURBINE ENGINES CONTAIN ADDITIVES WHICH ARE READILY ABSORBED THROUGH THE SKIN AND ARE HIGHLY TOXIC. EXCESSIVE AND/OR PROLONGED EXPOSURE OF THESE LUBRICANTS TO THE SKIN SHOULD BE AVOIDED.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Container Capacity 19 Liters (5 gallons)
C.	Corrosion Resistant Steel Lockwire
D.	Torque Wrench 55 and 600 lbf.in. (0.62-6.8 m.daN)
R E. Model ACT 790	Combustible Gas Detector Snap-On Tools Corp. Kenosha, WI 53141-1410 USA
F. Model V-3	Viscometer The Gerin Corp. P.O. Box 307 Neptune, NJ 07717 USA
G. Model VISPROBE	Viscometer Airbone Analytical Labs P.O. Box 518 EAST HANOVER, NJ 07936 USA
Referenced Procedures	
- 12-13-79, P. Block 1	Oil System Replenishment
- 71-00-00, P. Block 501	Power Plant
- 71-13-00, P. Block 301	Cowl Doors
- 72-00-00, P. Block 501	Engine - General
- 79-00-00, P. Block 301	Oil - General
- 79-21-01, P. Block 401	Lube and Scavenge
- 79-22-01, P. Block 401	Scavenge Oil Filter
- 79-22-01, P. Block 601	Scavenge Oil Filter
- 79-22-03, P. Block 401	Magnetic Plug

3. Procedure

A. Job Set-Up
(1)Open safety and tag the appropriate circuit breakers and open fan and

thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

B. Servicing Requirement

CAUTION : IF LUBE SYSTEM IS INADVERTENTLY SERVICED WITH FLUID DISSIMILAR TO SYNTHETIC OIL, SUCH AS MIL-L-6081 OR HYDRAULIC FLUID, THE ENGINE SHOULD NOT BE OPERATED UNTIL THE EFFECTS ON THE ENGINE HAVE BEEN ASSESSED.

(1) Oil Brands and Types - Use only the oils listed in Service Bulletin S/B 79-001. They are the only types approved for use in this engine.

(2) Oil Change Requirements.

(a) The oil sample should be obtained from the oil filler port of the oil tank. Make sure that the extraction equipment and container are free of contamination.

(b) The engine oil must be changed if the condition of the oil exceeds any one of the following limits.

PROPERTIES	TEST METHOD	LIMITS
1. Viscosity at 100°F (38°C)	ASTM D455	35% increase from actual measured new oil viscosity
2. Acid Number	ASTM D644 or D974	2.0 mg maximum of KOH per gram of oil
3. Foam	ASTM D892	300 milliliters
4. Solids	MIL-L23699B, using a 1.2 micron membrane filter	*75 milligrams per liter
5. Flash point, (Test for fuel)	ASTM D92-57 or SETA Flash	340°F (171°C) and higher

NOTE *: If solids in oil after an oil change exceed 40 milligrams per liter, the oil system should be flushed.

(3) Oil consumption Measurement.

(a) The oil actually consumed by the engine must be accurately measured to provide proper assessment of engine condition.

(b) (Ref. 71-00-00, P. Block 501), for parameters of normal and excessive oil consumption.

WARNING : WAIT AT LEAST 5 MINUTES AFTER ENGINE SHUT-DOWN BEFORE REMOVING OIL CAP TO ALLOW TANK PRESSURE TO BLEED OFF. HOT OIL GUSHING FROM TANK COULD CAUSE SEVERE BURNS.

(c) observe the following precautions when measuring oil consumption :

1 Checking oil level - Check the oil level within 30 minutes after engine shutdown. Service as required.

2 Look for possible fuel in the oil system at each oil system servicing. If fuel is in the oil system, it can usually be found by one or more of the indications that follow :

- you smell fuel in the oil
- the oil has a lower viscosity (use a viscometer)

- there is an indication of a combustible gas in the oil tank (use a combustible gas detector)
- the oil tank overflows when the filler cap is open.

3 If fuel is found in the oil system, do the trouble shooting procedure (Ref. Trouble Shooting Manual 79-00-00) and the oil system flush procedure (Ref. 79-00-00, P. Block 301).

4 Manual servicing - When the engine is motored, the core engine rpm is not sufficient to allow the scavenge portion of the lube and scavenge pump to draw oil from the sumps back to the tank. This allows oil to hide in the sumps. If you add oil when the engine is cold or has not operated for a long time, oil consumption can be measured as apparently high. This will give data that is not correct.

5 Pressure fill servicing - The amount of residual oil in the overfill hose plus the overflow oil must be subtracted from the added oil to compute consumed oil.

C. Post Maintenance Servicing with the Same Engine Oil Brand

(1)Oil system draining (Ref. Fig. 301) (sheet 1/6)

(a)Remove drain caps, plugs, screens, and tubes at the following locations, allow oil to drain, clean, and reinstall.

NOTE : Visually examine drained oil and screens for contaminants.

NOTE : Replace preformed packings and gaskets when plugs, tube, and screens are installed. Lubricate preformed packings with engine oil prior to installing.

1 Oil tank - TORQUE drain plug (Ref. Fig. 301) (sheet 4/6) to between 540 and 600 lbf.in. (6.10 and 6.78 m.daN) and wirelock

2 Accessory gearbox - TORQUE cap (Ref. Fig. 301) (sheet 2/6) in scavenge line to between 270 and 300 lbf.in. (3.05 and 3.39 m.daN).

3 Remove Master Chip Detector (Ref. Fig. 301) (sheet 3/6) from housing and depress check valve to drain oil. Reinstall.

4 IDG fuel/oil cooler "Oil Out" tube (Ref. Fig. 301) (sheet 3/6). TORQUE B-nut to between 540 and 600 lbf.in. (6.1 and 6.8 m.daN).

5 Transfer gearbox scavenge tube (Ref. Fig. 301) (sheet 2/6). Secure with four bolts, washers, and nuts. TORQUE to between 55 and 70 lbf. in. (0.62 and 0.79 m.daN).

6 (Ref. Fig. 301) (sheet 4/6). Install D-sump scavenge tube at TRF. TORQUE B-nut to between 650 and 770 lbf.in. (7.35 and 8.70 m.daN). Install spray shield and TORQUE nuts to between 24 and 27 lbf.in (0.62 and 0.79 m.daN). Wirelock.

7 Lube and scavenge pump inlet screens (Ref. Fig. 301) (sheet 2/6) (qty 6). TORQUE plugs to between 150 and 170 lbf.in. (1.69 and 1.92 m.daN). Wirelock

NOTE : Hold lube-in screen partially in by hand to lift shutoff valve and drain supply line. Clean screens before reinstalling.

8 Fuel/oil heat exchanger oil out tube (Ref. Fig. 301) (sheet 6/6). Retain gasket if serviceable. Secure with 4 bolts and flat washers. TORQUE bolts to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN). Wirelock.

9 Remove lube and scavenge pump filter bowl (Ref. Fig. 301) (sheet 2/6) (Ref. 79-21-01, P. Block 401)
a Hold filter element partially in by hand to lift shutoff valve and drain supply line.
b Clean filter element and reinstall. Hand tighten and wirelock.
10 Remove scavenge oil filter element (Ref. Fig. 301) (sheet 5/6) and drain as follows :
a Remove scavenge oil filter element (Ref. 79-22-01, P. Block 401) and inspect the element (Ref. 79-22-01, P. Block 601). Replace element if necessary.
b Gently lift scavenge filter shutoff valve and allow OIL OUT tube to drain.
c Install scavenge oil filter element (Ref. 79-22-01, P. Block 401)

(2)Oil system fill after system maintenance, drain or flush.

CAUTION : DURING MANUAL FILL, ADD THE OIL SLOWLY SO THAT THE FILLER NECK CAPACITY WILL PERMIT PROPER FLOW.

(a)Gravity fill the oil tank.
1 Remove the oil tank filler cap
Do an inspection for fuel or fuel vapor in the oil tank as follows :
- smell the oil for fuel
- look for an indication of combustible gas (use a combustible gas detector)
- examine the oil for a decrease of oil viscosity as compared to new, un-used oil of the same brand (use a viscometer)
- it is possible that fuel is in the oil tank. Fuel or hydraulic fluid can be in the oil tank if it over flows when the filler cap is opened
- if fuel is present in the oil tank, do the oil contamination by fuel trouble shooting procedure (Ref. TSM 79-00-00).

2 Check relative oil level as indicated by sight glass.
3 Add oil until it runs out the oil tank filler cap opening.
4 Install filler cap and check for looseness and positive locking.

(b)Pressure fill engine oil tank
1 Connect engine oil servicing cart line to the pressure fill port. Connect a drain hose (line) to the overfill port and remove port caps and attach quick disconnect line fittings.
2 If a large quantity of oil (0.5 quarts (0.5 liter) or more) flows from the drain hose, it is possible that fuel or hydraulic fluid is in the oil tank. Do the oil contamination by fuel trouble shooting procedure (Ref. TSM 79-00-00).
3 Slowly pump oil into the oil tank. When the oil begins to flow from the hose connected to the overfill port, do not pump any more oil into the oil tank.
4 Disconnect the line from the oil fill port.
5 Wait until no more oil flows from the hose connected to the overfill port.
6 Disconnect the hose from the overfill port.
7 Be careful to replace and secure port caps.

(c)If supply line to the lube and scavenge pump has been drained, prime system as follows :
1 Remove lube and scavenge pump LUBE-IN drain plug and hold screen

partially in by hand to lift shutoff valve until a steady stream of oil appears. This indicates that the supply line is purged of air.

2 Install drain plug, TORQUE to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN) and wirelock.

(d)Dry motor engine per 72-00-00, P. Block 501 for 3-5 minutes to purge system for air and check for leaks.

(e)Check relative oil level on sight glass after engine shut-down. If oil level is below sight glass, replenish to a maximum of 3 quarts low as indicated by sight-glass i.e. bass floating at top of sight glass.

NOTE : After motoring engine, oil tank level will be approximately 2 quarts low due to oil not scavenging back to the tank. Before filling to fill port, operate engine at ground idle.

(f)Operate engine at ground idle or above for a minimum of 3 minutes.

NOTE : This step may be performed during airplane or engine ground check.

(g)Perform oil servicing (Ref. 12-13-79, P. Block 1).

(3)Oil system flushing

(a)Drain oil system per paragraph 3.C. (1).

NOTE : Do not install new preformed packings (unless damaged) or safetywire until the flushing oil has been drained.

(b)Fill oil system per paragraph 3.C. (2).

CAUTION : DURING RUN, MONITOR THE ENGINE LUBE SYSTEM INSTRUMENTATION CAREFULLY. SHUT DOWN ENGINE IMMEDIATELY IF DEVIATIONS FROM OPERATING LIMITS OCCUR.

(c)Operate engine at 90 percent N1 power or above (Ref. 71-00-00, P. Block 501) for 3 minutes minimum and until a minimum lube scavenge temperature of 139°F (65°C) is attained. Shut down engine.

NOTE : This step may be performed during airplane or engine ground checks.

(d)Drain oil system per peragraph 3.C.(1).

(e)Fill oil system per paragraph 3.C.(2).

D. Servicing with a Different Approved Engine Oil Brand

In the event it is required to change from one brand of oil to another, the following procedure is recommended.

(1)Remove all of the previous brands of oil from stocks to prevent intermixing of oils.

(2)Re-identify brand of oil to be used on the oil servicing door.

(3)Document inservice date at which the new oil brand was introduced.

(4)Replace the main oil filter (Ref. 79-22-01, P. Block 401).

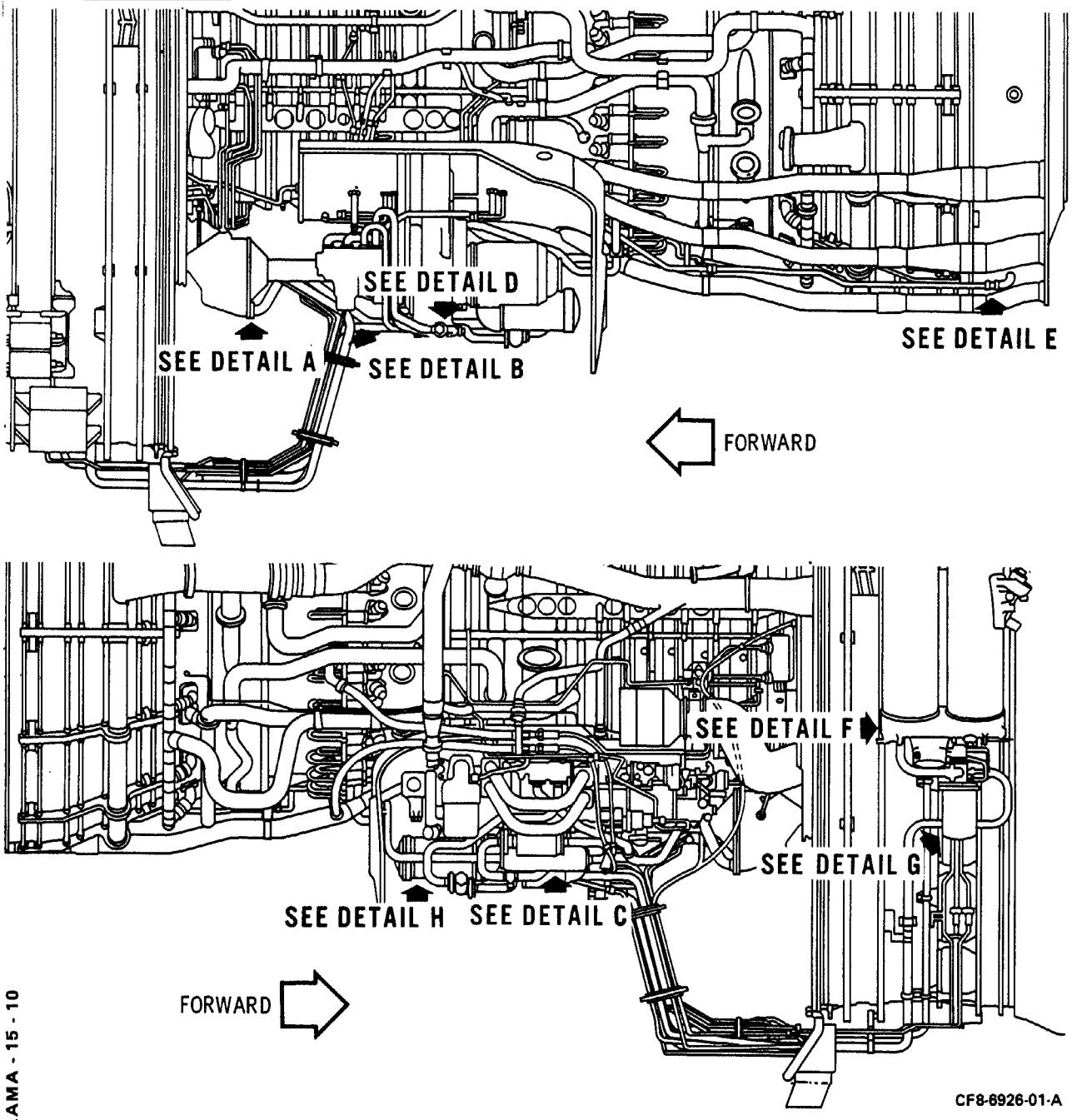
(5)Inspect the magnetic chip detectors (Ref. 79-22-03, P. Block 401).

(6)Start use of new oil batch by topping up the oil tank at each regularly scheduled oil servicing interval (Ref. 12-13-79, P. Block 1.).

NOTE : Do not drain old oil brand from oil tank or from the engine prior to initiating the oil brand change by topping up.

(7)Review oil pressure trend values at least the three months prior to the oil brand change. Record the average oil pressure trend value.

CAUTION : IF THE OIL PRESSURE TREND CHANGE OF 3-5 PSI OF MORE IS IDENTIFIED, AFTER THE OIL BRAND CHANGE, AN IMMEDIATE "D" SUMP AIR FLOW CHECK IS RECOMMENDED TO ELIMINATE THE POSSIBILITY OF



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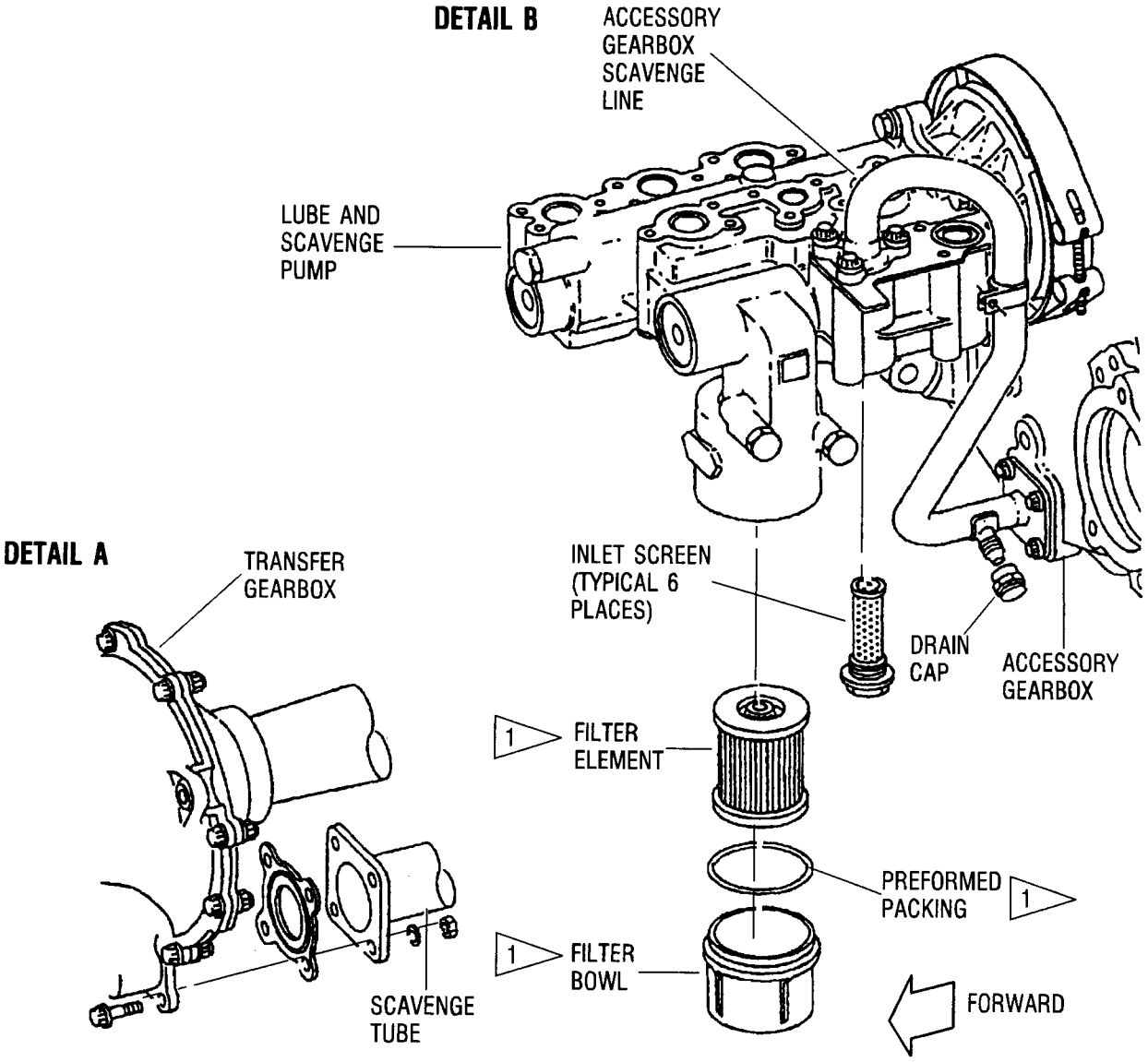
DM5

Lubrication System Draining - Disconnect Points (Sheet 1/6)
Figure 301

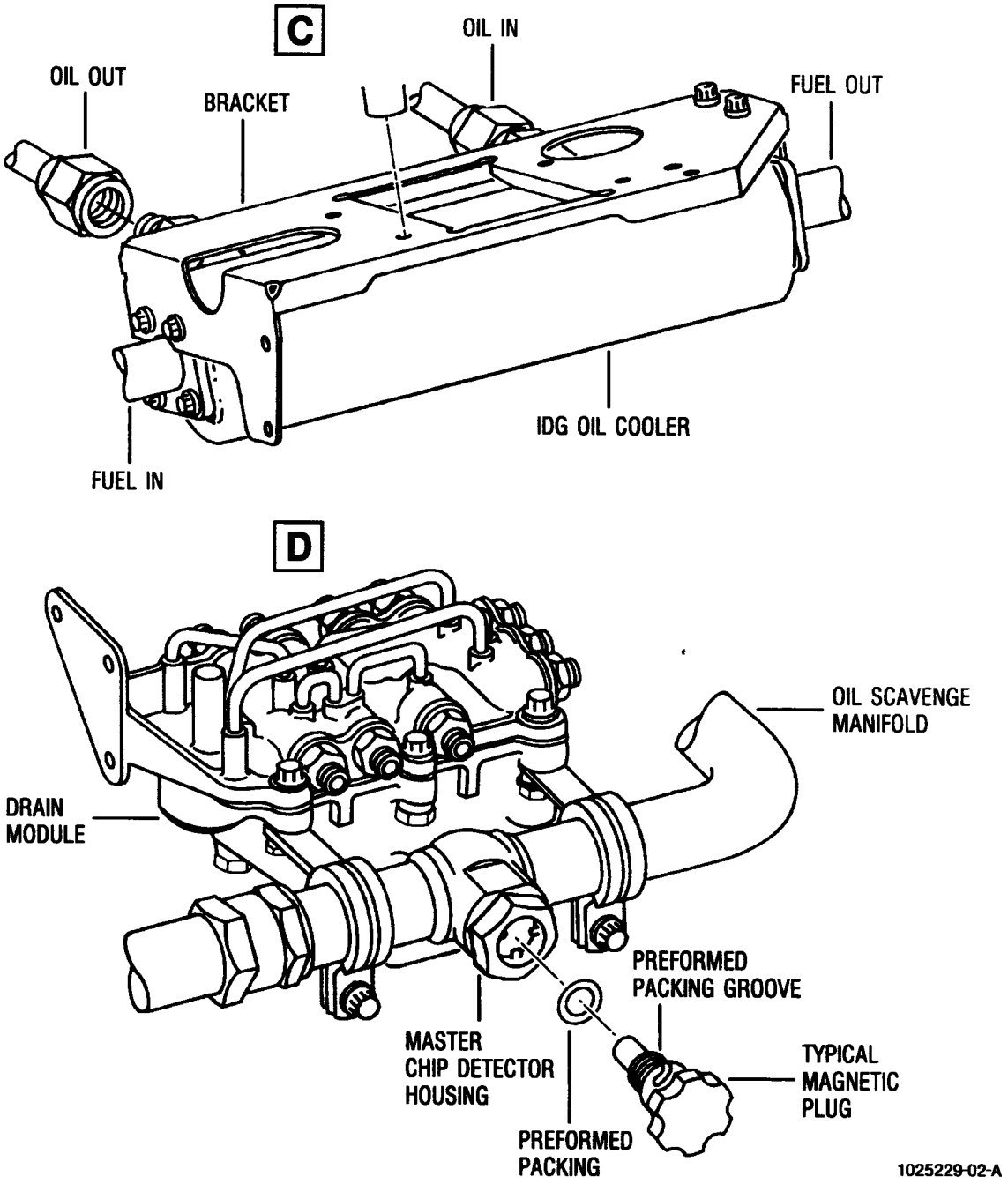


1 GE SERVICE BULLETIN 79-047 DOES NOT USE THE LUBE FILTER. SERVICE BULLETIN 79-047 USES A NEW LUBE AND SCAVENGE PUMP ASSEMBLY THAT DOES NOT HAVE THE LUBE SUPPLY FILTER AND BYPASS AND SERVICE SHUT-OFF VALVES.

1025228-02-A

BM5 79 00 00 3 LAMJ 02

Lubrication System Draining - Disconnect Points (Sheet 2/6)
Figure 301



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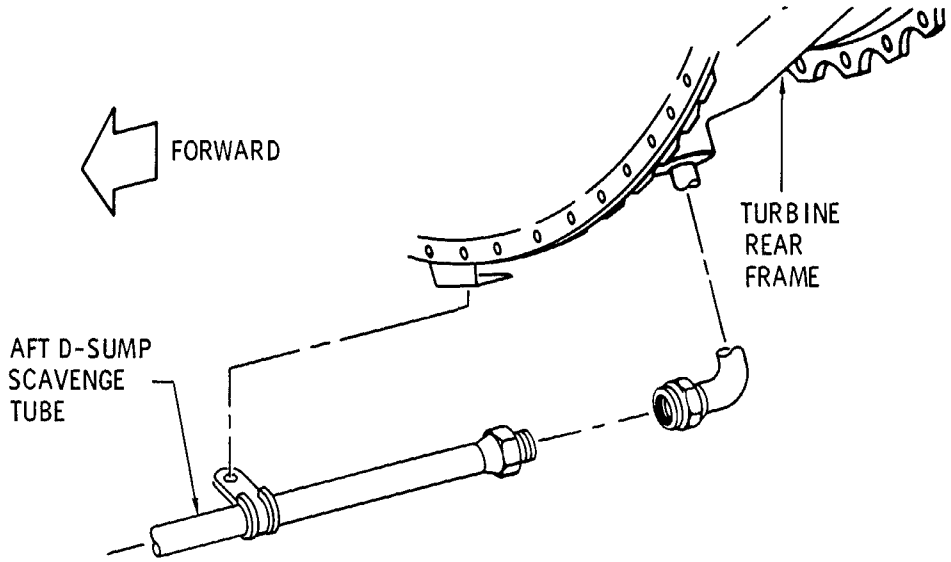
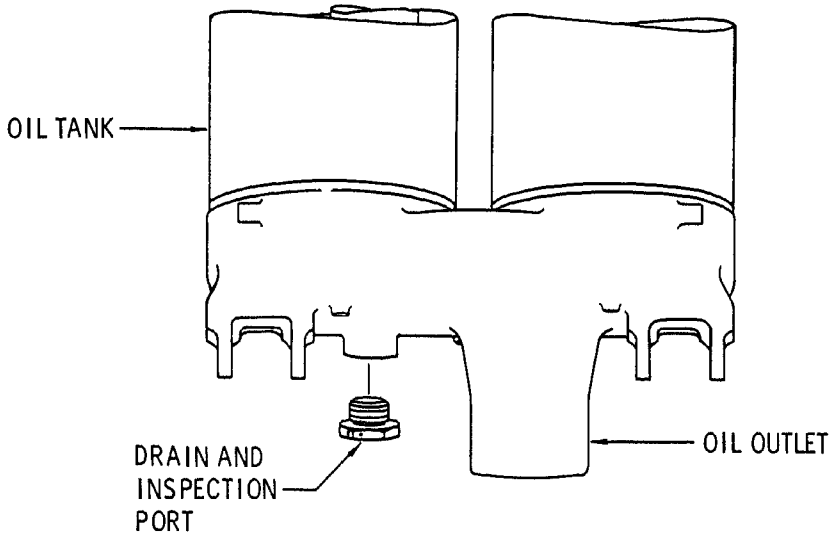
Lubrication System Draining - Disconnect Points (Sheet 3/6)
Figure 301

DETAIL E



DETAIL F



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BM5 79 00 00 3 LAML - 19 - 14
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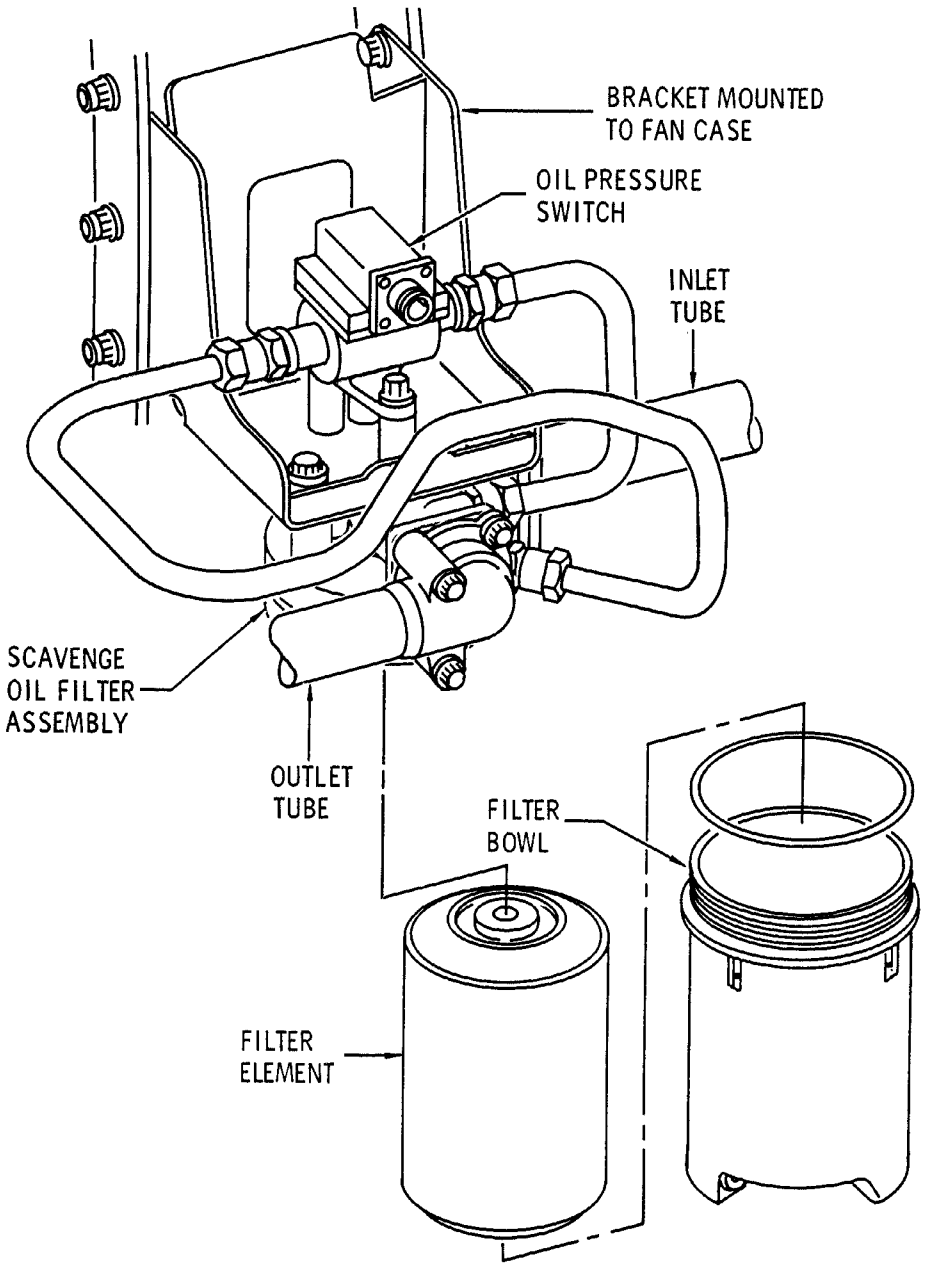
Lubrication System Draining - Disconnect Points (Sheet 4/6)
Figure 301

DETAIL G



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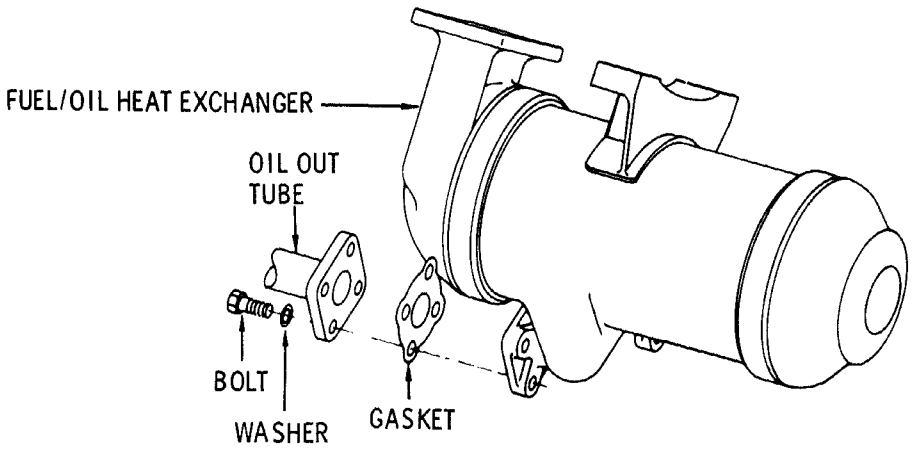
Lubrication System Draining - Disconnect Points (Sheet 5/6)
Figure 301

DETAIL H



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BM5 79 00 00 3 LAMT - 15 - 10
DM5

Lubrication System Draining - Disconnect Points (Sheet 6/6)
Figure 301

A CLOGGED OR PARTIALLY CLOGGED LUBE SUPPLY NOZZLE OR SUPPLY/ SCAVENGE LINES.

(8) Monitor oil pressure trend values of the new brand oil and look for any oil pressure trend shifts of 3-5 psig.

(9) Notify general electric aircraft engines of any abnormal oil system experience.

E. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers.

1. General

This procedure pertains to the lubrication system. It covers oil leak, borescope, lube wetted component damage detection, and special inspections.

WARNING : SYNTHETIC LUBRICANTS USED IN AIRCRAFT TURBINE ENGINES CONTAIN ADDITIVES WHICH ARE READILY ABSORBED THROUGH THE SKIN AND ARE HIGHLY TOXIC. DO NOT LET THEM TOUCH YOUR SKIN REGULARLY AND/OR CONTINUOUSLY.

2. Oil Leak Detection

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)	Container (5 Gal.) (19 Liters)
(3)	Caps and Plugs
(4)Material No.C02-019	Antiseize Compounds, Lubricants, Oils (Ref. 70-00-00)
(5)Material No.C05-023	Inspection and Marking Compounds (Ref. 70-00-00)
(6)Material No.C05-100	Inspection and Marking Compounds (Ref. 70-00-00)
(7)Material No.C10-071	Miscellaneous (Ref. 70-00-00)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 72-00-00, P. Block 601	Engine - General
- 72-65-00, P. Block 601	Accessory Gearbox Assembly
- 79-00-00, P. Block 701	Oil General

B. Job Set-Up

Open, safety and tag the applicable circuit breakers and open cowl doors (Ref. 71-13-00, P. Block 301).

C. Accessory Gearbox Carbon Seal Leak Detection

(Ref. 72-65-00, P. Block 601) for procedure.

NOTE : Leakage of AGB carbon seals can be detected during operation at max power assurance, by observing for presence of fluid in container attached to the accessory gearbox seal drain, or attach a sensitive pressure or vacuum/pressure gage and observe for a positive reading.

D. Oil Leak Detection Procedures

NOTE : Use only when routine leak detection procedures have not been successful. Repair all obvious leaks and clean surfaces of oil before using these procedures.

(1)Check seal drains and fittings for leaks as follows :

(a)Wrap suspect fittings with gauze held in place with a wrap of aluminum foil and bound with safetywire as an aid in isolating leaks to fittings. Wrap must extend over ends of Gamah fittings to detect leaks.

(b)Disconnect drain lines and route to containers, to isolate seal drain leaks.
(c)Operate engine at 95 to 100 percent N2 for 5 minutes.
(d)Inspect containers and gauze for oil.
(2)Fluorescent-Penetrant Inspection.
NOTE : This procedure is to be used if undetectable leaks still exist in the lubrication system.
(a)Mix one ounce of fluorescent-penetrant powder (C05-023)in 2 quarts (1.9 liters) of engine oil (C02-019).
NOTE : Make sure solution is thoroughly mixed to ensure proper suspension of the powder.
NOTE : If fluorescent-penetrant liquid (C05-100) is used, add 1 qt (0.946 l) to the oil tank.
(b)Add powder/oil mixture to the engine oil tank, and then fill oil tank with oil (C02-019).
NOTE : Before operating the engine to check for leaks, the engine should be clean and thoroughly dry. Remove spray shield from D sump supply fittings to provide an unobstructed view of the fittings.
(c)Operate engine at ground idle for 5 minutes and then shut down. Use a black (ultraviolet) light to check for oil leaks. The fluorescent-penetrant suspension in the oil will be fluorescent yellow when exposed to black light, thus permitting the detection and location of engine leaks.
(d)As leaks are detected and repaired, all resultant fluid should be washed (using isopropyl alcohol) from the engine and cowl and a clean, dry condition maintained. This condition is an absolute requirement to prevent masking additional leaks in the same area.
(e)In order to determine the location of leaks occurring only at high engine speed, the operation should consist of start, acceleration to takeoff power, then shutdown.
(f)After all engine leaks have been corrected, accomplish system flushing to clean system.

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close cowl doors (Ref. 71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers.

3. Compressor Borescope Oil Leak Detection
NOTE : Borescope inspection of compressor can locate internal oil leaks, indicated by oil wetting or staining.

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)2C6388	Borescope Kit
Referenced Procedures - 71-13-00, P. Block 301	Cowl Doors

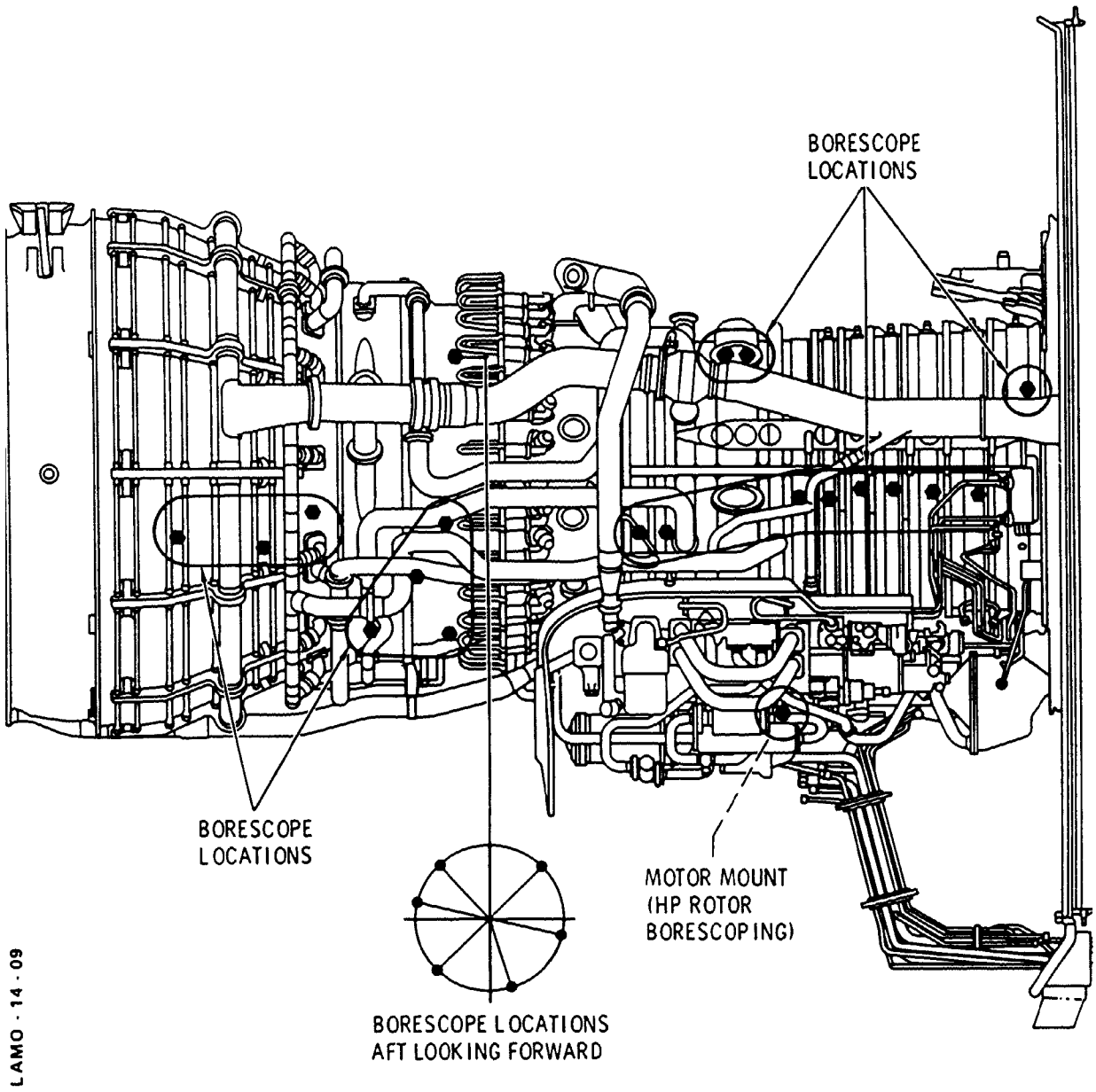
ITEM	DESIGNATION
- 72-65-00, P. Block 601	Accessory Gearbox Assembly

B. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open cowl doors (Ref. 71-13-00, P. Block 301).
NOTE : Borescope inspection of compressor can locate internal oil leaks, indicated by oil wetting or staining.

C. Procedure
(1)Install fiber light probe set II in borescope port B1-0 and observe for oil wetting or staining as follows :
(a)View down and forward at the 6 o'clock fan frame strut No. 7 trailing edge. Inspect the radial aft weld bead on the strut fairing from the upper to lower extremes for oil wetting. If oil is flowing down the weld it will show a rippling effect. Observe for a puddle or oil wetting at the lower end of the strut. Oil wetting at the bottom of the strut will appear as a shiny oval area just aft of the strut trailing edge.
(b)View aft and inspect the inlet guide vanes and stage 1 blades for oil wetting and/or brown oil stains.
(c)Position the probe to inspect the split line area in front of the inlet guide vane inner shroud.
NOTE : Oil wetting of the fan frame strut and/or the inlet guide vanes, and the aft core blades and vanes may occur as a result of leakage of oil from the A sump enclosure. The same oil wetting indication may also occur as a result of an engine "hung start" or no fan rotation without any fault in the lube system.
(2)Install probe set II in borescope port B1-1 and observe for oil wetting or staining as follows :
(a)Position the probe as shown (Ref. Fig. 601) and rotate the core and inspect for oil wetting and/or brown oil stains.
(b)As the core is rotated observe for oil dripping from the drain holes in the 1st stage disk.
(c)Observe for oil wetting (drops) on nuts and shroud.
(d)Move the probe outward and inspect the stage 1 blades and vanes, and stage 2 blades for oil wetting and/or brown oil stains.
NOTE : Oil wetting indications as noted in this inspection, with no oil wetting of the inlet guide vanes or forward, is probably indicative of leakage through the inlet gearbox drive spline due to a damaged seal or a loose spline adapter retainer.

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove safety clips and tags and close circuit breakers. Close cowl doors (Ref. 71-13-00, P. Block 301).

4. Metal in Screen (MIS) Analysis



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Compressor Borescope Inspection for Oil Leaks
Figure 601

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)Material No.C04-001	Cleaning Compounds and Solvents (Ref. 70-00-00)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 72-65-00, P. Block 601	Accessory Gearbox Assembly
- 79-00-00, P. Block 701	Oil-General

A. Job Set-Up

(1)Open, safety and tag the appropriate circuit breakers and open cowl doors (Ref. 71-13-00, P. Block 301).

B. Procedure

The collection of metal debris in the lube system scavenge screens and filters or on magnetic chip detectors can indicate parts distress in oil wetted sections of the engine. In normal engine operation, some particles will be collected. They are usually small in size and quantity. Also material can be collected which is unrelated to engine parts such as shotpeen residue and tool fragments or machining chips.

NOTE : More analysis of debris on the magnetic chip detector is available (Ref. TSM 79-00-20, P. Block 101).

(1)Isolate source of suspect material found on inspection of magnetic chip detector or scavenge oil filter as follows :

(a)Check the lube and scavenge pump scavenge inlet screens or magnetic isolation plugs.

NOTE : The pump has 5 scavenge ports. Note which port is being checked to avoid errors in identifying source of suspect material. Port identifications are on bottom of pump housing.

(b)If source of suspect material in screens is unknown, check the isolation magnetic plugs in each screen base and conduct an engine ground run.

WARNING : THIS SOLVENT IS TOXIC AND SHOULD BE USED WITH ADEQUATE VENTILATION. AVOID PROLONGED BREATHING OF VAPORS. REPEATED OR PROLONGED CONTACT WITH THE SKIN WILL REMOVE OILS AND CAUSE SEVERE DERMATITIS.

(c)Use a solvent (C04-001) and clean oil from the suspect material. Separate the magnetic material and isolate large or unique pieces for inspection and identification.

(d)If unable to identify material and attribute to a particular source part, send the material to a qualified laboratory for spectrographic analysis.

(e)If it is determined that internal (A-, B-, C-, or D- sump) bearing distress is occurring, engine operation should be discontinued and the engine removed/repaired as soon as possible. Also, a lube system cleanup is required (Ref. 79-00-00, P. Block 701).

(2)If a source of suspect material cannot be found by ground run with the

fault isolation plugs, put the engine "on watch" and monitor as follows :

(a)Clean or replace monitoring devices. Save residue for diagnosis.

(b)Continue engine in service, if other engine parameters do not confirm engine trouble, such as : increasing vibration, EGT, oil consumption, SOAP (Spectrometric Oil Analysis Program) results, etc.

(c)Inspect the magnetic chip detector and pump scavenge inlet screens and fault isolation plugs daily or after each flight.

(d)If distress is not confirmed after two consecutive days of service, return to normal monitoring practices/intervals.

(3)Perform diagnosis of suspect material to determine part(s) distress and make corrective action as recommended in the following example :

(a)Use a magnifying glass, examine material on the magnetic chip detector, pump scavenge inlet screens or fault isolation plugs. Look particularly for bearing spall material, recognizable by characteristic flake appearance. Indications of bearing distress or failure requires immediate removal of accessory gearbox drivepads, accessory gearbox, transfer gearbox or horizontal driveshaft or engine. Also, a lube system cleanup is required (Ref. 79-00-00, P. Block 701).

(4)Engine removal is not important for the following material collection :

(a)Labyrinth seal rub strip and coatings such as silver plate or Sermetel. A spectrographic analysis should be performed to confirm these materials.

(b)Preformed packings, gaskets or omni seals.

(c)The fragments (pieces) from a control alternator magnet.

(d)Go back to the usual procedures and schedule inspection times to monitor the operations.

5. Special Inspections

(1)If oil comes out of the oil tank when you open the filler cap, the oil system can have fuel or hydraulic fluid.

(2)Oil System Contamination

Any engine with oil system contamination caused by fuel, hydraulic fluid, or other contaminants must have the maintenance procedures done to clean the oil system. This must be done along with the maintenance necessary to correct the cause of the problem (Ref. 72-00-00, P. Block 601).

1. General

This procedure pertains to cleaning of the lubrication system after lube wetted parts failure.

NOTE : Contamination downstream of lube and scavenge pump filter, heavy accumulation of contaminants on supply filter screen, or contamination in pump scavenge screens other than the scavenge screen for the area in which a failure occurred, may indicate a possible filter bypass condition. This may require disassembly of the engine for cleaning of lube tubes, lube jets, sumps, gearboxes, and bearings.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B. Material No.C04-002	Cleaning Compounds and Solvents (Ref. 70-00-00)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 79-22-03, P. Block 401	Magnetic Plug
- 79-00-00, P. Block 301	Oil-General
R - 79-11-00, P. Block 401	Oil Tank
- 79-21-01, P. Block 401	Lube and Scavenge Pump
- 79-22-01, P. Block 401	Scavenge Oil Filter
- 79-22-02, P. Block 401	Heat Exchanger

3. Procedure

WARNING : SYNTHETIC LUBRICANTS USED IN AIRCRAFT TURBINE ENGINES CONTAIN ADDITIVES WHICH ARE READILY ABSORBED THROUGH THE SKIN AND ARE HIGHLY TOXIC. EXCESSIVE AND/OR PROLONGED EXPOSURE OF THESE LUBRICANTS TO THE SKIN SHOULD BE AVOIDED.

A. Job Set-Up

(1)Open, safety and tag the appropriate circuits breakers and open cowl doors (Ref. 71-13-00, P. Block 301).

B. Component Removal

(1)Remove scavenge tubing from damaged area to lube and scavenge pump.

(2)Remove scavenge return tube between lube and scavenge pump and scavenge oil filter.

(3)Remove master chip detector (Ref. 79-22-03, P. Block 401).

C. Cleaning

WARNING : HYDROCARBON SOLVENTS ARE FLAMMABLE AND TOXIC. AVOID PROLONGED CONTACT WITH THE SKIN AND OBSERVE PRECAUTIONS AGAINST FIRE.

(1)Flush removed tubes thoroughly with solvent (C04-002).

(2)Swab tube ID with a clean rag or blow dry with clean shop air.

(3)Remove and replace scavenge oil filter element (Ref. 79-22-01, P. Block 401) and clean bowl. Reinstall assembly.

(4)If scavenge oil filter bypass is indicated or suspected, the following additional steps must be taken :
(a)Replace scavenge oil filter (Ref. 79-22-01, P. Block 401) heat
R exchanger (Ref. 79-22-02, P. Block 401) and oil tank (Ref. 79-11-00, P. Block 401). Return contaminated parts to shop for disassembly and cleaning per Component Maintenance Manuals.
(b)Remove and clean scavenge return tube between filter and oil tank and lube supply tube between oil tank and lube and scavenge pump per steps (1) and (2).

D. Component Installation
(1)Replace lube and scavenge pump (Ref. 79-21-01, P. Block 401).
NOTE : Remove and examine the lube supply filter (Ref. 79-21-01, P. Block 401) and the pump inlet screens (Ref. 79-21-01, P. Block 401) to find out how much contamination is in the engine.

(2)Secure scavenge return tube between lube and scavenge pump and scavenge oil filter with bolts and washers. TORQUE bolts to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN).
(3)Install master chip detector (Ref. 79-22-03, P. Block 401).
(4)Install scavenge tubing to damaged area.

E. Lube System Flushing
(1)Flush lube system (Ref. 79-00-00, P. Block 301).
(2)After flushing engine, remove lube and scavenge pump screens (Ref. 79-21-01, P. Block 401) scavenge oil filter element (Ref. 79-22-01, P. Block 401) and magnetic plug (Ref. 79-22-03, P. Block 401) for inspection ; clean and reinstall. If contamination is excessive, repeat flushing procedure as required.

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove safety clips and tags and close circuit breakers. Close cowl doors (Ref. 71-13-00, P. Block 301).

OIL TANK - DESCRIPTION AND OPERATION

1. General (Ref. Fig. 001)

The oil tank is installed at 3 o'clock on the aft fan case and supported by three isolation mounts to dampen vibration. The tank consists of two side-by-side cylinders capped at both ends and coated with silicone rubber so that the oil tank is fire proof.

The tank is fitted with :

- a pressure fill port.
- a gravity filler cap.
- a pressurizing valve installed on the oil scavenge system and an oil desaerator.
- a supply port, in the tank lower section, for the lube pump.
- a tank drain port and a scupper drain port.
- a mounting base for the oil quantity transmitter (for indication in the flight compartment main instrument panel and ECAM system).
- a sight gage visible from the access panel.

The oil tank volume is 30 liters (32 quarts U.S.).

- the oil fill level is 25 liters (26 quarts U.S.).
- the useful oil volume is 13.2 liters (14 quarts U.S.).

R The normal oil consumption is 0.24 L/h (0.25 quarts U.S./h).

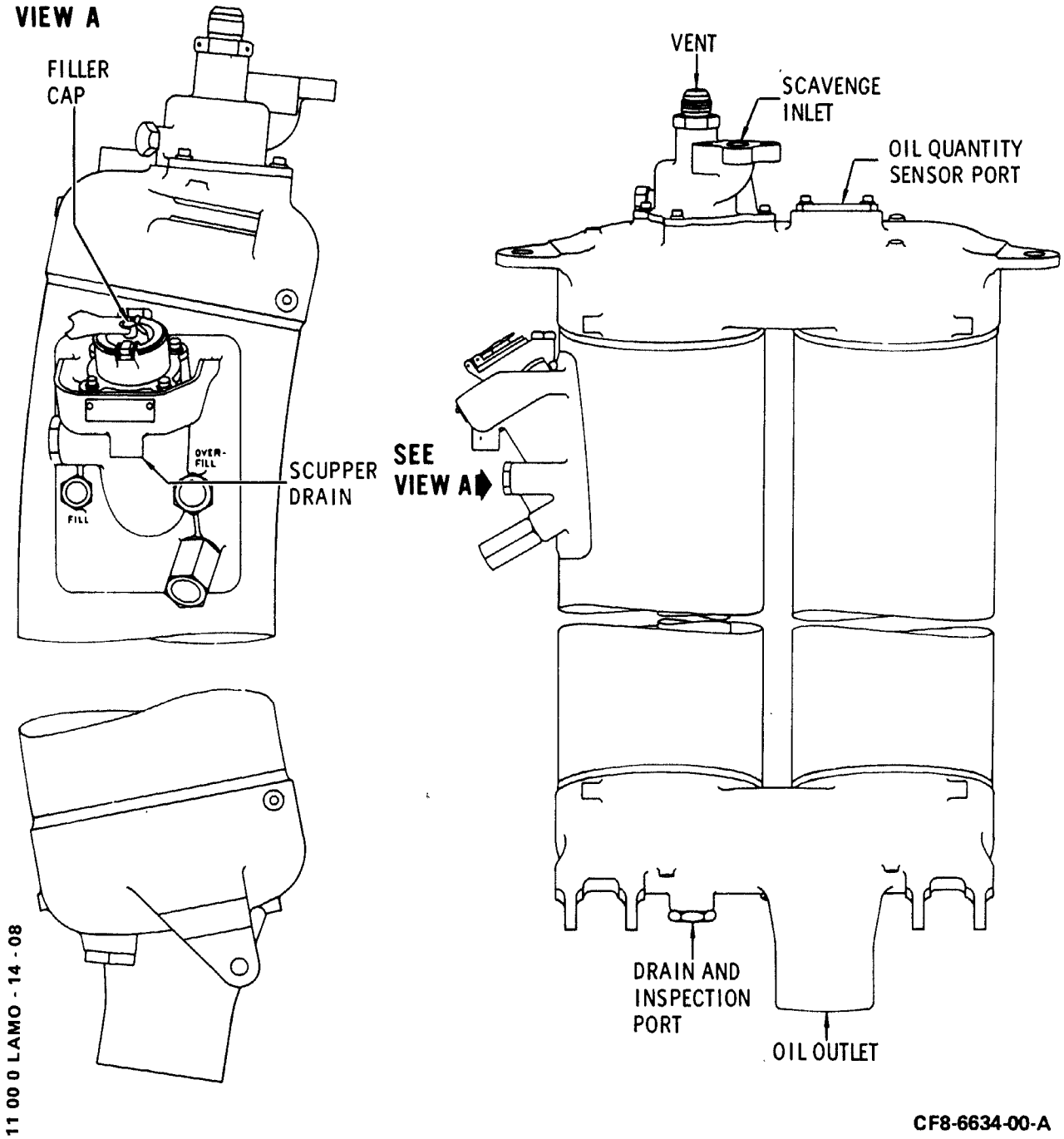
In normal operation, the tank is pressurized by the air included in the scavenge oil which is extracted by the scavenge pump from the gearbox. Pressurizing air pressure is between 0.48 and 0.76 bar (7 and 11 psid) with respect to the oil tank sump pressure.

During engine shutdown, the pressurizing air is vented overboard, thus enabling to open the gravity filler cap at least five minutes after engine shutdown for oil servicing.

The tank is vented to atmosphere pressure when the pressure inside the tank reaches 2.41 bars (35 psid), the maximum tank test pressure being 3.03 bars (44 psid).

NOTE : The extreme possible flight time is 12 hours in the following conditions :

- ferry-flight
- all fuel tanks full at take-off
- cruise in long range conditions
- altitude 37000 ft./41000 ft.
- mach number = 0.79
- range = 6441 nautical miles



Oil Tank
Figure 001

OIL TANK - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Container
C. Material No.C02-019	Anti Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
D.	Corrosion Resistant Steel Lockwire
E.	Torque Wrench 55 - 425 lbf.in. (0.62 - 4.80 m.daN)
Referenced Procedures	
- 71-00-00, P. Block 501	Power Plant - General
- 71-13-00, P. Block 301	Cowl Doors

2. Procedure

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENGINES/ENG1/OIL QTY	1EN	336/Q68
133VU	ENGINES/ENG2/OIL QTY	2EN	336/Q73

(2)Open, safety and tag the appropriate circuit breakers and open fan cowl door (Ref. 71-13-00, P. Block 301).

B. Removal (Ref. Fig. 401)

WARNING : WAIT AT LEAST 5 MINUTES AFTER ENGINE IS SHUTDOWN TO ALLOW TANK PRESSURE TO BLEED OFF BEFORE REMOVING PLUG. HOT OIL GUSHING FROM TANK COULD CAUSE SEVERE BURNS. PROLONGED CONTACT OF LUBRICATION OIL WITH SKIN CAN CAUSE DERMATITIS. OIL WILL STAIN CLOTHING AND CAN SOFTEN PAINT.

(1)Remove lockwire and remove drain plug from oil tank. Drain oil into container. Remove and discard packing.

(2)Lubricate new packing with oil. Reinstall drain plug. TORQUE to between 540 and 600 lbf.in. (6.10 and 6.78 m.daN) and wirelock.

(3)Loosen overfill drain line B-nut and disconnect line.

(4)Loosen vent line B-nut and disconnect.

(5)Remove 4 bolts securing scavenge line ; remove line and gasket. Retain gasket for reuse, if serviceable.

(6)Remove 4 bolts securing oil supply line, remove line and gasket. Retain gasket for reuse, if serviceable.

(7)Disconnect electrical connector from oil quantity transmitter.

(8)Remove nut and bolt securing cable to bracket.

(9)Remove nut and bolt securing tank top mounting clevis to mounting link. Remove 2 washers, 2 isolation mounts, 2 spacers, and the bushing.

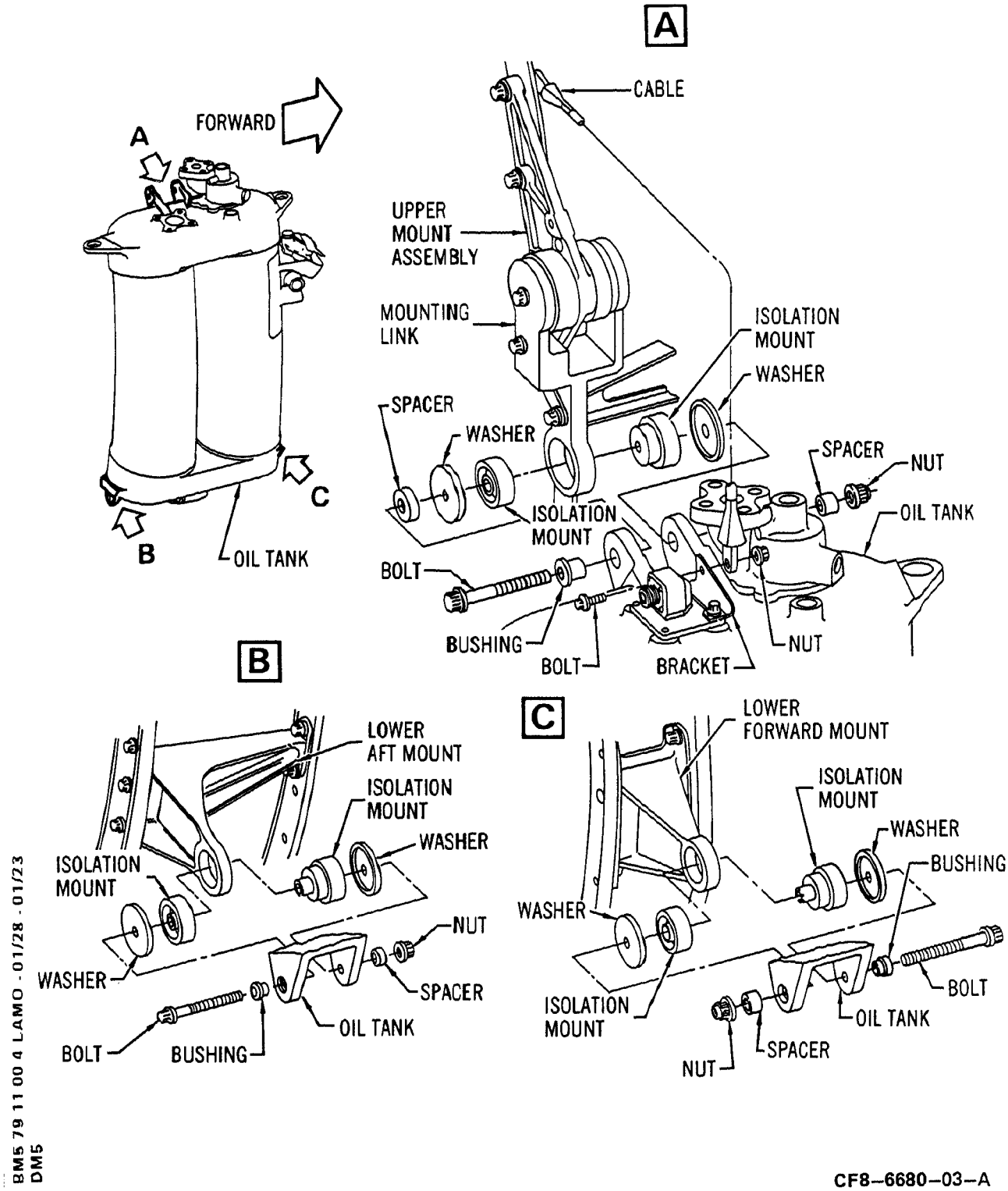
(10)Remove 2 nuts, 2 bolts, 4 washers, 4 isolation mounts, 2 spacers, and 2 bushings securing tank bottom mounting clevises to fan case brackets.
(11)Install protective caps or covers on all lines and ports of oil tank.

C. Installation

(1)Position 2 isolation mounts, 2 washers, and the larger spacer on mounting link. Position oil tank against mounting link and secure tank top mounting clevis with bushing, bolt, smaller spacer, and nut. Do not tighten nut at this time.
(2)Position 2 isolation mounts and 2 washers on each fan case bracket. Secure each tank bottom mounting clevis with bushing, bolt, spacer, and nut.
(3)**TORQUE** nuts securing oil tank to between 190 and 230 lbf.in. (2.15 and 2.60 m.daN).
(4)Connect vent line. **TORQUE** tube B-nut to between 650 and 770 lbf.in. (7.3 and 8.7 m.daN) and wirelock.
(5)Place scavenge line gasket over port and secure line with 4 bolts. **TORQUE** bolts to between 55 and 70 lbf.in. (0.62 and 0.78 m.daN).
(6)Place oil supply line gasket over port and secure line with 4 bolts. **TORQUE** bolts to between 55 and 70 lbf.in. (0.62 and 0.78 m.daN).
(7)Connect overfill drain line. **TORQUE** line B-nut to between 270 and 300 lbf.in. (3.1 and 3.4 m.daN) and wirelock.
(8)Connect cable to bracket using nut and bolt. **TORQUE** nut to between 55 and 70 lbf.in. (0.62 and 0.78 m.daN).
(9)Connect oil quantity transmitter electrical connector. Tighten connector fingertight plus one-eighth turn and wirelock
(10)Fill tank with oil (CO2-019).
(11)Dry motor engine for 3-5 minutes to purge lube system of air. Check for leaks.
(12)After coastdown, check oil level in tank. Replenish if required.
(13)Perform test as indicated in "Type of testing after engine component replacement" (Ref. 71-00-00, P. Block 501).
NOTE : This step may be performed during aircraft or engine ground checks.

D. Close-Up

(1)Close fan cowl doors (Ref. 71-13-00, P. Block 301).
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove safety clips and tags and close circuit breakers.



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Oil Tank
Figure 401

OIL TANK - INSPECTION/CHECK

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

2. Procedure

A. Job Set-Up

(1)Open, safety and tag the appropriate circuit breakers and open left fan cowl door.

B. Visually inspect the following :

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(1)Main Body of Tank for :		
(a)Nicks, dents, and scratches in weldment body	Dents limited to 0.250 in. (6.35 mm) in depth and smooth contour. Nicks and scratches limited to 0.008 in. (0.20 mm) in depth.	Replace tank
(b)Loose coating	Any amount	Remove loose coating
(2)Leaks for :		
(a)At parting line flanges	None permitted	Check torque of flange bolts and/ or replace O-ring. Inspect O-ring sealing surfaces for damage
(b)At fittings	None permitted	Check torque on fittings. Replace O-ring. Inspect sealing surface
(c)Body of tank	None permitted	Replace tank
(3)Filler cap and uncoated tank surfaces for corrosion (discoloration)	No scaling or pitting	

C. Close-Up

(1)Remove safety clips and tags and close circuit breakers. Close left fan cowl door (Ref. 71-13-00, P. Block 301).

OIL TANK - APPROVED REPAIRS

1. General
These procedures describe the only approved repairs that may be done on the oil tank at the on-line maintenance level. No other repairs are authorized.

2. Filler Cap Assembly Replacement (Ref. Fig. 801)

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)	Corrosion Resistant Steel Lockwire
(3)Material No.C02-019	Antiseize Compounds, Lubricants, Oils (Ref. 70-00-00)
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

B. Job set-up
(1)Open, safety and tag the appropriate circuit breakers and open fan cowl doors (Ref. 71-13-00, P. Block 301).

C. Procedure
(1)Remove filler cap assembly
(a)Remove safetywire and remove four bolts securing cap and adapter to oil tank fill port flange.
(b)Remove cap and adapter from oil tank. Discard preformed packing.
(2)Install filler cap assembly
(a)Lubricate new preformed packing with engine oil (C02-019) and install onto adapter flange.
(b)Align locating tab with oil drain port and position cap and adapter on fill port flange.
(c)Secure with four bolts. TORQUE bolts to between 33 and 37 lbf.in. (0.37 - 0.42 m.daN) and wirelock.

D. Close-up
(1)Close fan cowl doors (Ref. 71-13-00, P. Block 301).
(2)Remove safety clips and tags and close circuit breakers.

3. Tank Pressurizing Valve Replacement
(Ref. Fig. 802)

A. Equipment and Materials

ITEM	DESIGNATION
(1)Material No.C02-019	Antiseize Compounds, Lubricants, Oils (Ref. 70-00-00)
(2)	Circuit Breaker Safety Clips
Referenced Procedure	

ITEM	DESIGNATION
- 71-13-00, P. Block 301	Cowl Doors

B. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open fan cowl doors (Ref. 71-13-00, P. Block 301).

C. Procedure
(1)Remove valve
(a)Disconnect vent line.
(b)Remove valve and preformed packing. Discard packing.
(2)Install valve
(a)Lightly coat new preformed packing with oil (C02-019) and install on valve.
(b)Thread valve into de-aerator with arrow on hex face pointing away from tank. TORQUE to between 650 and 770 lbf.in. (3.39 - 4.8 m.daN).
(c)Connect vent line and TORQUE fitting to between 650 and 770 lbf.in. (7.34 - 8.7 m.daN).

D. Close-up
(1)Close fan cowl doors
(2)Remove safety clips and tags and close circuit breakers

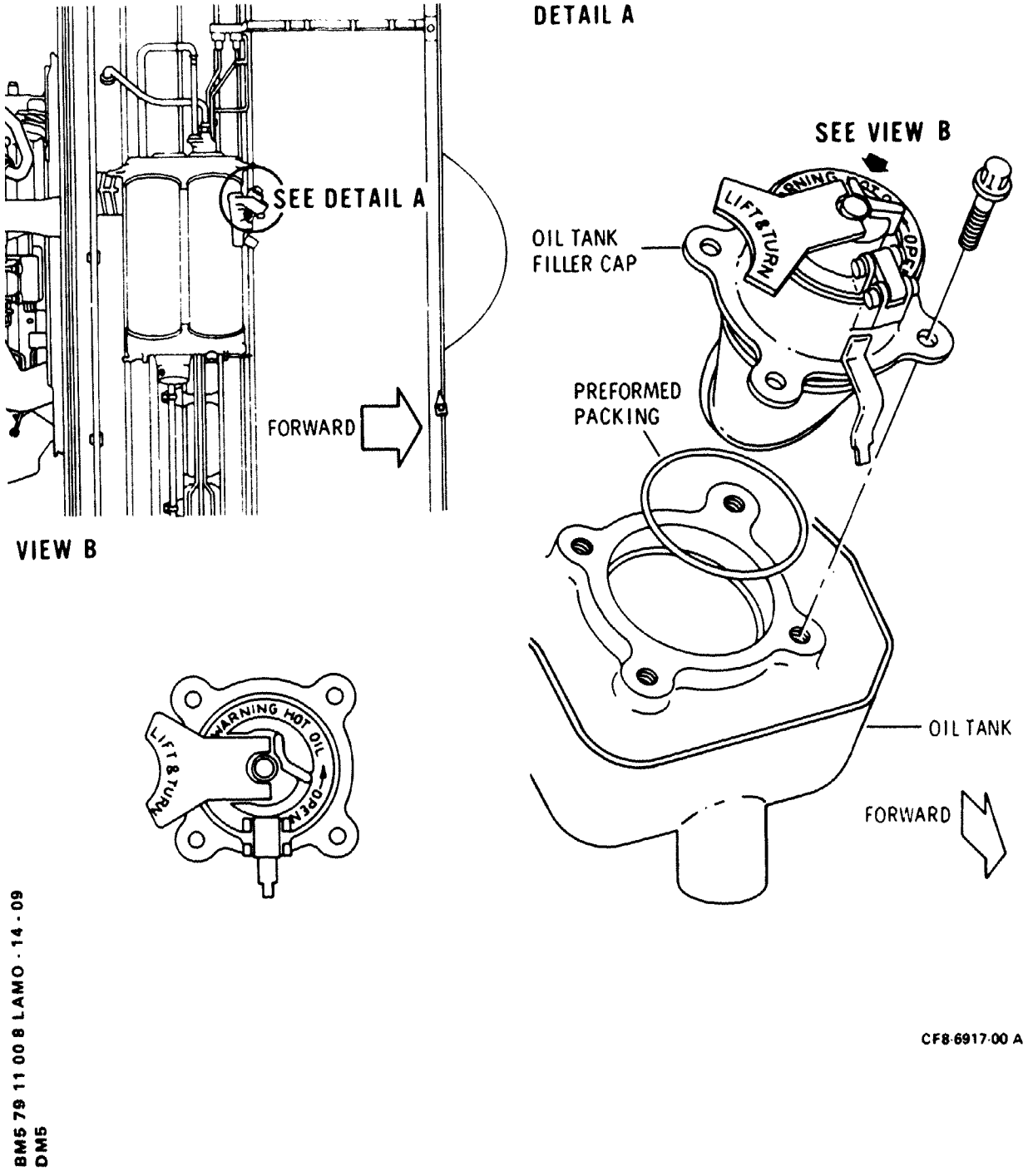
4. Oil Tank Pressure Relief Valve Replacement (Ref. Fig. 802)

A. Equipment and Materials

ITEM	DESIGNATION
(1)Material No.C02-019	Antiseize Compounds, Lubricants, Oils (Ref. 70-00-00)
(2)	Circuit Breaker Safety Clips
(3)	Corrosion Resistant Steel Lockwire
(4)	Torque Wrench
Referenced Procedure	
- 71-13-00, P. Block 301	Cowl Doors

B. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open fan cowl doors (Ref. 71-13-00, P. Block 301).

C. Procedure
(1)Remove oil tank pressure relief valve as follows :
WARNING : WAIT AT LEAST FIVE MINUTES AFTER ENGINE IS SHUT DOWN BEFORE REMOVING DRAIN PLUG TO ALLOW TANK PRESSURE TO BLEED OFF. HOT OIL GUSHING FROM TANK COULD CAUSE SEVERE BURNS.
WARNING : PROLONGED CONTACT OF LUBRICATING OIL WITH SKIN CAN CAUSE DERMATITIS ; OIl WILL STAIN CLOTHING AND CAN SOFTEN PAINT.
(a)Remove lockwire from drain plug. Remove drain plug from engine oil



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Oil Tank Repair - Filler Cap Assembly Replacement
Figure 801

tank. Drain oil into a suitable container. Remove packing from drain plug and discard.

(b)Lubricate new packing with engine oil (CO2-019) and install on drain plug.
Install drain plug on oil tank and TORQUE to between 540 and 600 lbf.in. (6.10 and 6.78 m.daN). Install lockwire on drain plug.

(c)Remove lockwire from oil tank pressure relief valve. Remove oil tank pressure relief valve and discard preformed packing.

(2)Install oil tank pressure relief valve as follows :

(a)Lubricate a new preformed packing with engine oil (CO2-019) and install on oil tank pressure relief valve.

(b)Install oil tank pressure relief valve into tank and TORQUE to between 279 and 300 lbf.in. (3.05 and 3.39 m.daN). Install lockwire.

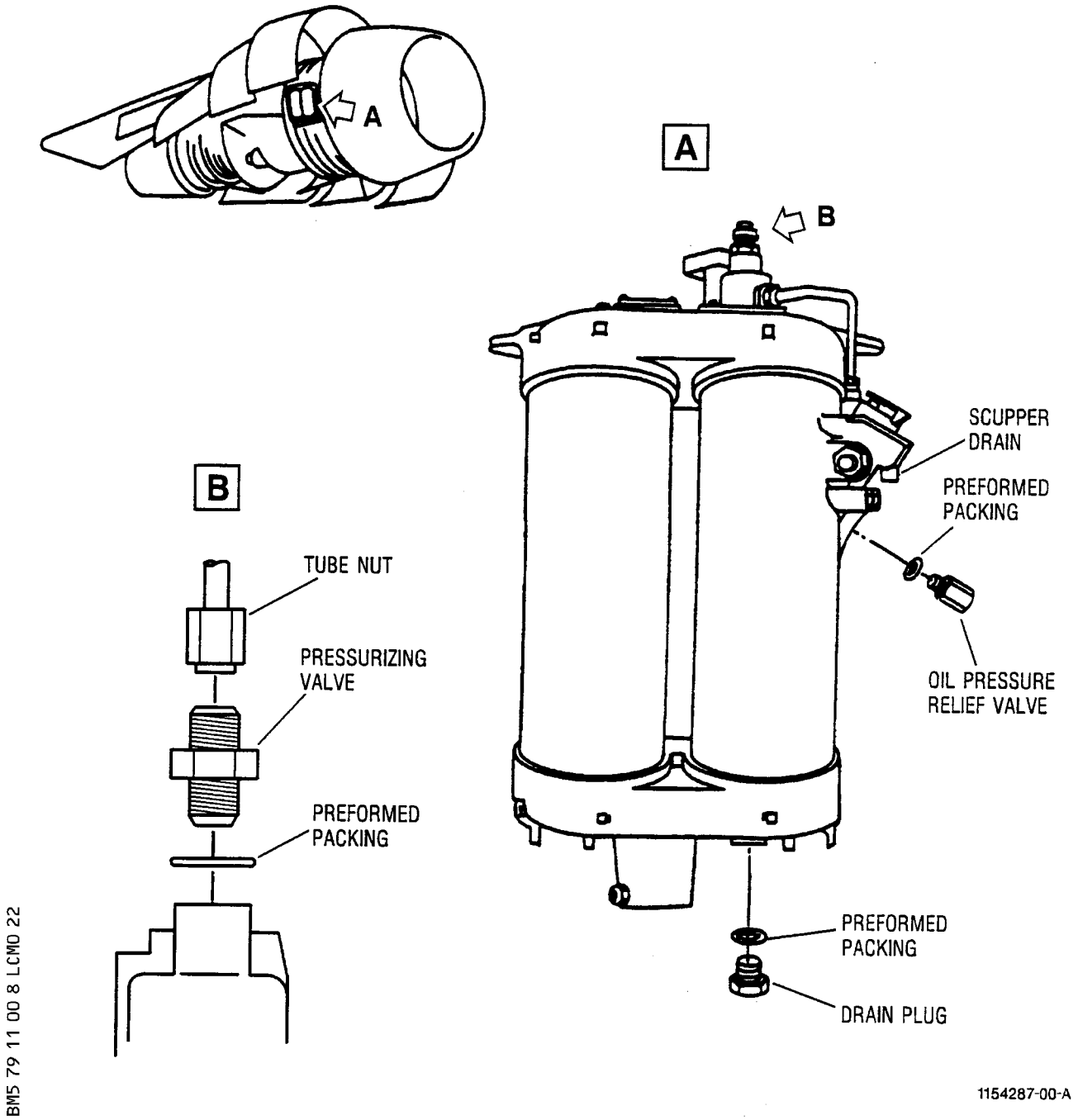
(c)Service oil system (Ref. 12-13-01).

D. Job Set-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2)Close fan cowl doors (Ref. 71-13-00, P. Block 301).

(3)Remove safety clips and tags and close circuit breakers.



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Oil Tank Pressure Relief Valve and Pressurizing Valve
Figure 802

1. Oil Flow

A. General (Ref. Fig. 001)

Oil from the oil tank is routed to the lube pump which is protected upstream by an inlet filter and downstream by an outlet filter and enters an isolation valve (anti-static leak valve) set to between 0.17 and 0.41 bar (2.5 and 6 psid) and is routed through a line, fitted with an oil pressure tap to the accessory gearbox (bevel gear, radial shaft bearing) and to the various bearings of the engine A, B, C, D sumps - requiring lubrication.
(Ref. Fig. 002)

B. System Components

(1)Lube pump inlet filter

This filter is a mesh element and protects the lube pump from foreign matter coming out of the oil tank (26 screens with 762 micron meshes).

(2)Lube pump

The lube pump forms a single assembly with the scavenge pumps. It is driven at N2 RPM by the accessory gearbox (N = 0.584 N2). The lube pump is of the vane type and provides a maximum flow rate of 63.4 L/mn (16.75 gpm) at N2 = 100%.

(3)Lube pump outlet filter

This filter has 74 micron meshes and provides oil system line protection against contamination.
It comprises a bypass valve which cracks open when the pressure differential in the filter reaches 276 bars (40 psid). The bypass valve is fully open when the pressure differential reaches 4.83 bars (70 psid), thus allowing circulation of unfiltered oil.

(4)Isolation valve

This valve set to between 0.17 and 0.41 bar (2.5 and 6 psid), prevents pump siphoning and thus depriming during engine shutdown.

(5)Oil pressure

The oil pressure transmitter enables the oil pressure within the system to be monitored. This pressure is indicated on the flight compartment main instrument panel and on the ECAM system.

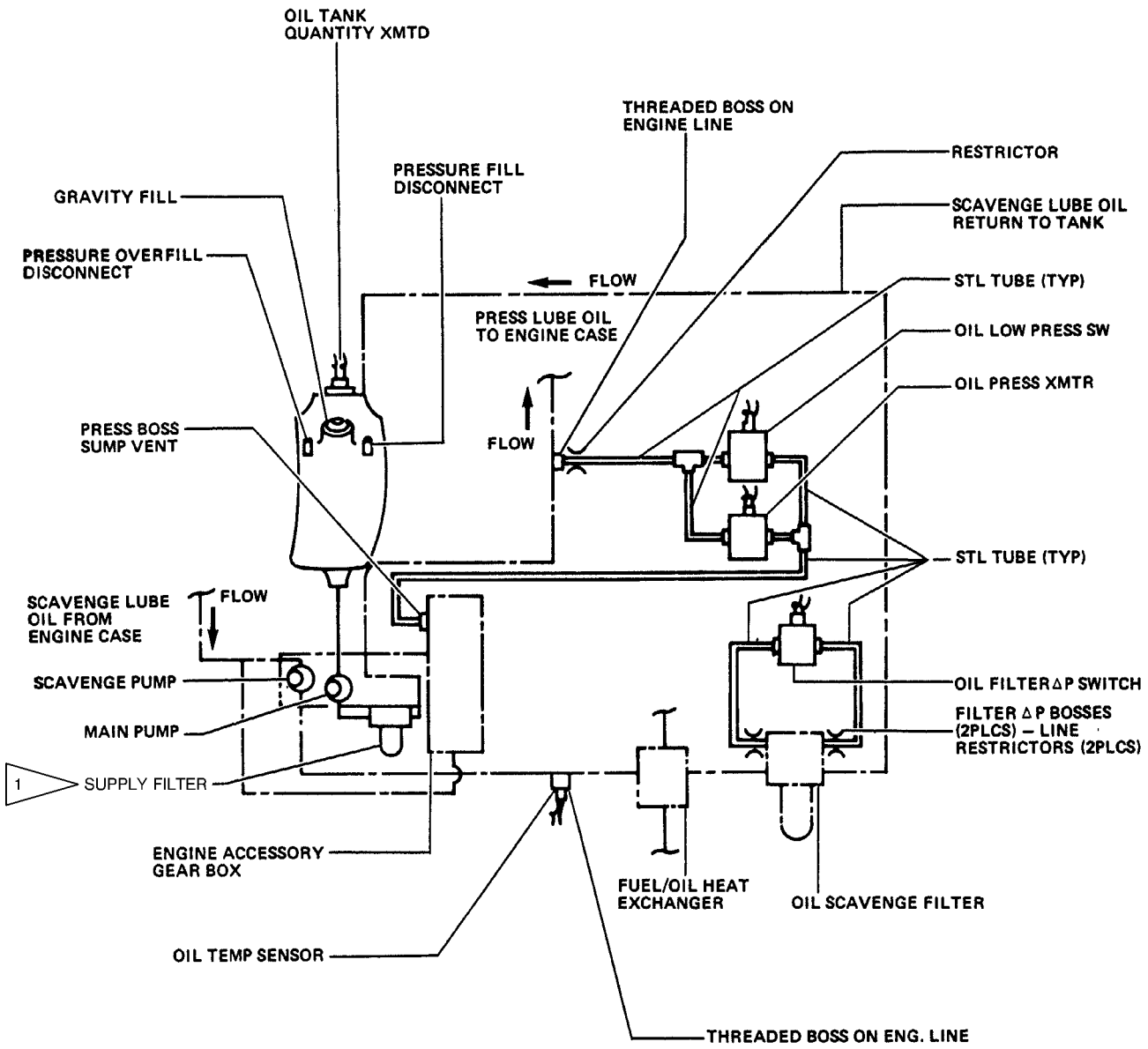
(a)Oil pressure normal values : they fluctuate according to N2 speed between 2.07 and 6.21 bars (30 and 90 psig).

(b)The oil pressure minimum value is 0.69 bar (10 psig) at idle.
A pressure switch tripping at 0.758 ± 0.069 bar (11 ± 1 psi) decreasing and at 0.965 ± 0.069 bar (14 ± 1 psi) increasing indicates an oil pressure too low.

NOTE : 1) A 0.69 bar (10 psig) oil pressure variation (at the same power setting) during a flight requires an engine inspection

2) The engine can be safety run from the start for 30 seconds if the lube pump is not supplied with oil.
No action has to be undertaken if the time during which the pump has been operated without oil does not exceed 30 sec.
Any operation without oil does not exceed 30 sec. Any

operation without lubrication exceeding 30 sec. must be indicated by the crew members.



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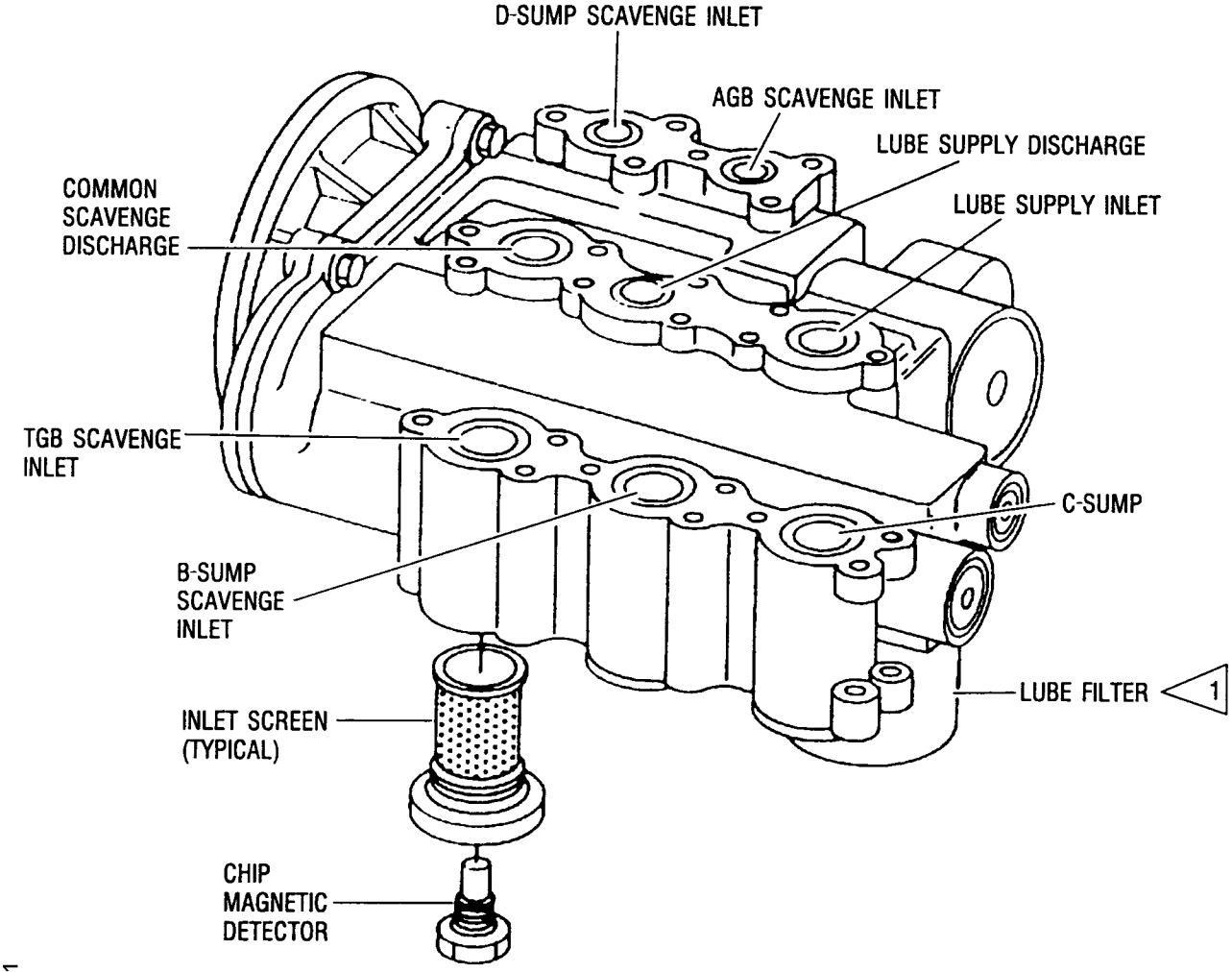
Engine Oil System
Figure 001



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1 GE SERVICE BULLETIN 79-047 DOES NOT USE THE LUBE FILTER. SERVICE BULLETIN 79-047 USES A NEW LUBE AND SCAVENGE PUMP ASSEMBLY THAT DOES NOT HAVE THE LUBE SUPPLY FILTER AND BYPASS AND SERVICE SHUT-OFF VALVES.

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Lube and Scavenge Pump
Figure 002

2. Oil Scavenge

A. General (Ref. Fig. 003)
The oil which has lubricated the engine bearings, accessory gearbox and bevel gear is scavenged by five pumps protected by an inlet filter equipped with a magnetic chip detector.
This oil is then collected in a single line comprising :
- a scavenge oil temperature sensor
- a master magnetic chip detector plug
- a scavenge filter which is bypassed when the differential pressure in the filter reaches 2.76 bars (40 psid)
- a fuel/oil heat exchanger.

After having circulated through those elements, the oil is sent back in the tank. The oil passes through a deaerator when the air pressure in the tank is too high, the tank pressurizing valve set to between 7 and 11 psid, opens and the air flows through the vent duct to the fan discharge.

B. System Components
(1)Scavenge pumps
The five scavenge pumps and the lube pump form a single assembly located on the accessory gearbox Forward face. These pumps are of the vane type and deliver a global (air/oil mixture) flow rate of 128 L/mn (33.9 gpm) at N2 = 100 %.
The oil sent in "A" sump is scavenged through the transfer gearbox bevel gear. This oil also lubricates the radial shaft. On No. 1 bearing of "A" sump, a labyrinth seal drain the oil drops projected under the effect of the centrifugal force during turns.
"B" and "C" sumps have each a scavenge pump like the accessory gearbox. Also, "D" sump has a disk centrifugal pump enabling the pressure at scavenge pump inlet to increase.
Each scavenge pump is protected by a 26 mesh (762 mm) inlet screen and each screen is fitted with an individual magnetic chip detector.

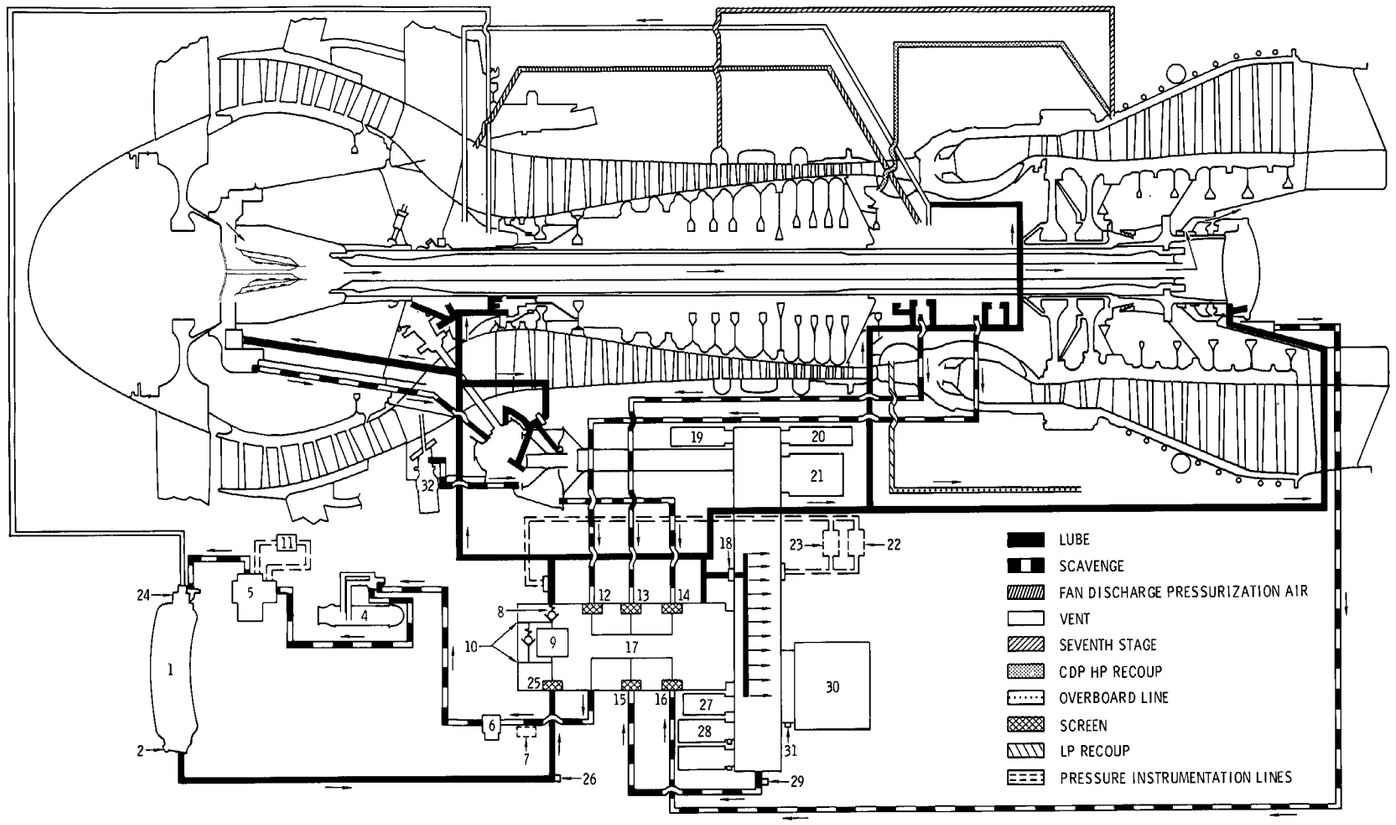
(2)Oil temperature sensor
The normal scavenge oil temperature is comprised between 71 and 160°C (160 and 320°F).
On cold days this temperature may drop to 57°C (135°F).
On hot days at high altitude and low engine speed, the temperature may reach 175°C (347°F) for no more than 15 mn. The maximum temperature at permanent duty is 160°C (320°F).
The scavenge oil temperature is indicated on the ECAM system.

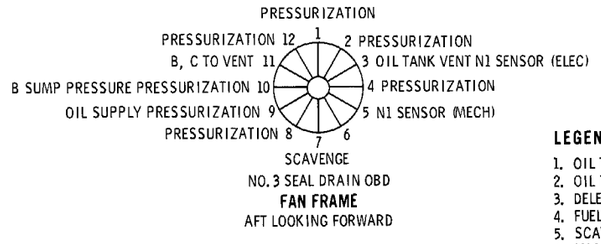
(3)Master magnetic chip detector (Ref. Fig. 004, 005)
This magnetic chip detector attracts magnetic particles to a removable magnetic plug. The plug can be removed during engine maintenance for inspection.
It is of the bayonet type and thereby can be quickly attached/detached.
Some scavenge systems will have a threaded magnetic chip detector. This option is up to the operator.

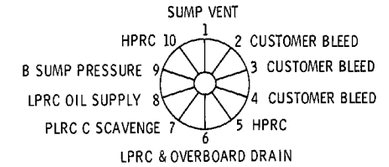
(4)Scavenge filter (Ref. Fig. 006)
The scavenge filter is installed near the oil pumps and can be detached easily. This filter has 15 micron meshes and filters all oil scavenged by

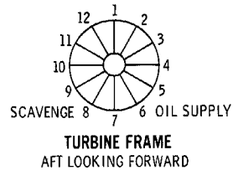
the five pumps.
If the pressure differential in the filter is higher than 2.206 ± 0.861 bar (31 ± 1.25 psid) increasing the amber OIL CLOG caution light comes on, on main instrument panel. The caution light goes off when the pressure differential in the filter is lower than 1.896 bar (27.5 psid) decreasing. When the pressure differential in the filter reaches 2.76 bars (40 psid) a bypass valve opens, enabling oil circulation without filtering. This valve is fully open at 4.83 bars (70 psid). The bypass path is so installed that collected contaminants are not in the bypass flow.

(5)Fuel/Oil heat exchanger (Ref. Fig. 007)
The function of the fuel/oil heat exchanger is to keep an adequate oil temperature in any operating case.
Nevertheless the fuel temperature must remain in the 1.7°C (35°F) to 143°C (229°F) range to prevent fuel freezing and pump cavitation.
The oil flows around the tubes in which the fuel runs.
During a cold start, the pressure differential within the heat exchanger is considerable due to the oil viscosity.
An oil pressure relief bypass valve set to 5.86 bar (85 psid) enables the oil to be transferred directly from heat exchanger inlet to the outlet without passing through the exchanger. The oil returns then to the tank.









LEGEND:

1. OIL TANK
2. OIL TANK DRAIN
3. DELETED
4. FUEL OIL HT. EXCHR.
5. SCAVENGE OIL FILTER
6. MAGNETIC CHIP DETECTOR
7. SCAVENGE OIL SENSOR
8. ANTI STATIC LEAK VALVE (CRACKS @ 2.5 TO 6 PSID)
9. SUPPLY FILTER
10. SUPPLY FILTERΔP TAPS
11. SCAVENGE FILTERΔP SWITCH
12. C SCAVENGE (IN)
13. B SCAVENGE (IN)
14. TGB SCAVENGE (IN)
15. AGB SCAVENGE (IN)
16. D SCAVENGE (IN)
17. LUBE & SCAVENGE PUMP
18. AGB OIL RESTRICTOR
19. FUEL CONTROL
20. FUEL PUMP
21. STARTER
22. OIL PRESSURE XMTR
23. OIL PRESSURE SW
24. OIL TANK PRESSURE VALVE (7-11 PSID)
25. INLET SCREEN
26. OIL SUPPLY TEMPERATURE
27. AC GEN (N2 SENSOR)
28. HYD. PUMPS (2)
29. AGB DRAIN
30. IDGS
31. DRAIN (TYP 6 PLACES)
32. N1 SENSOR IN STRUT 5 ROTATED 32^0 CW

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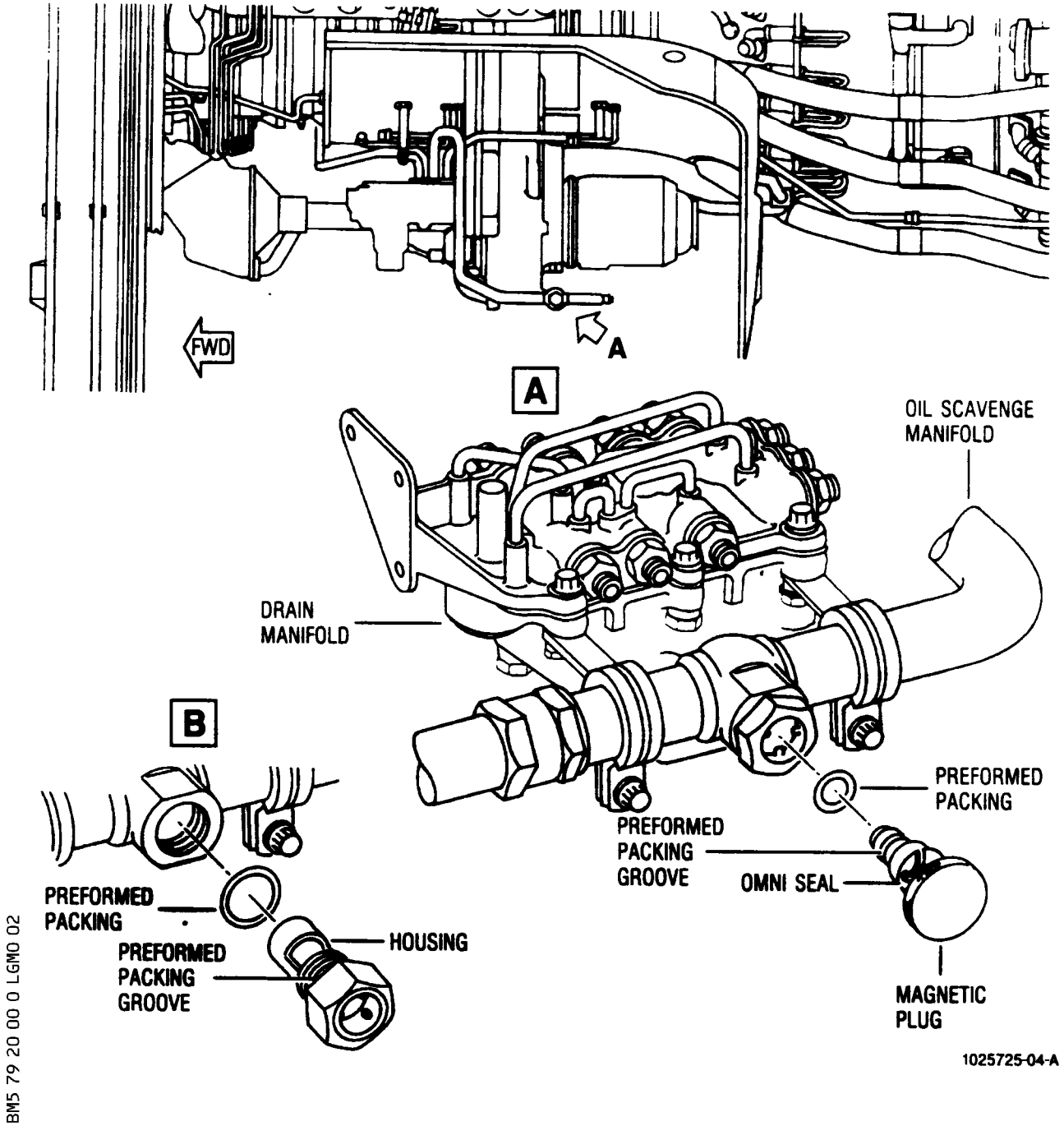
Lubrication System Schematic
Figure 003



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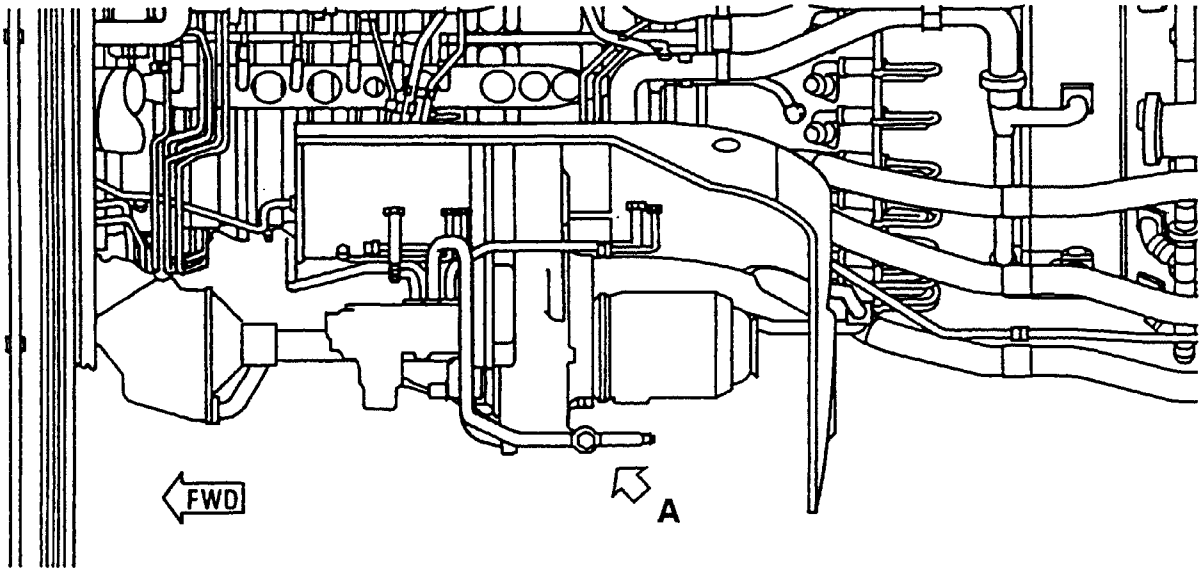
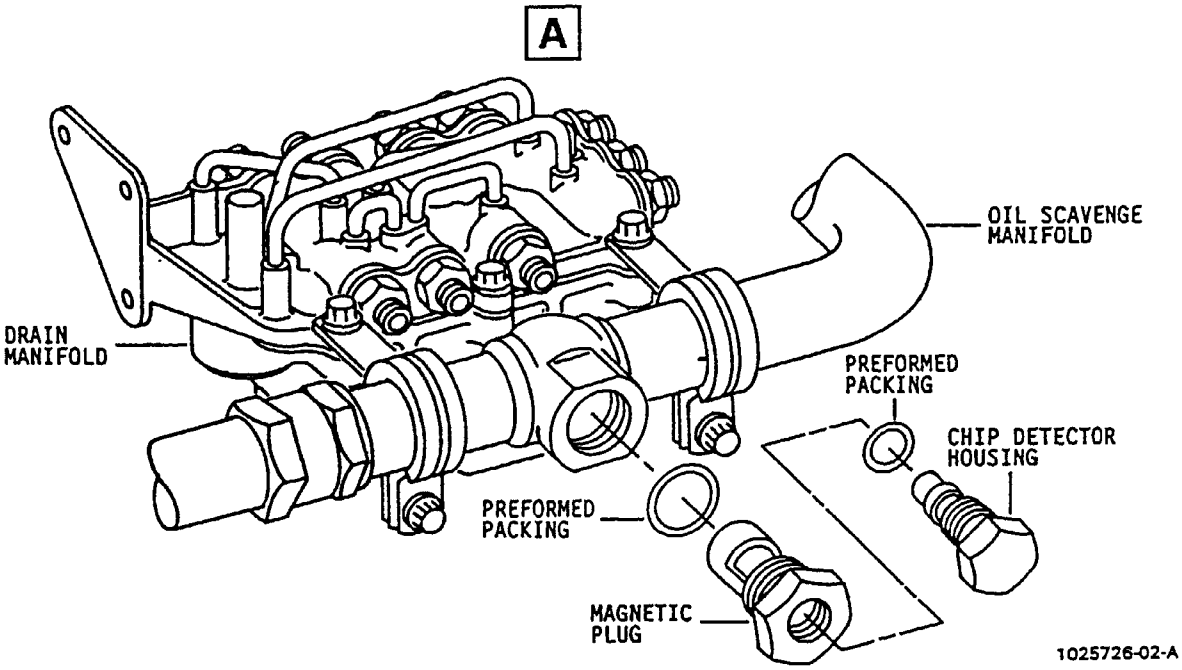
Chip Detector Installation
Figure 004





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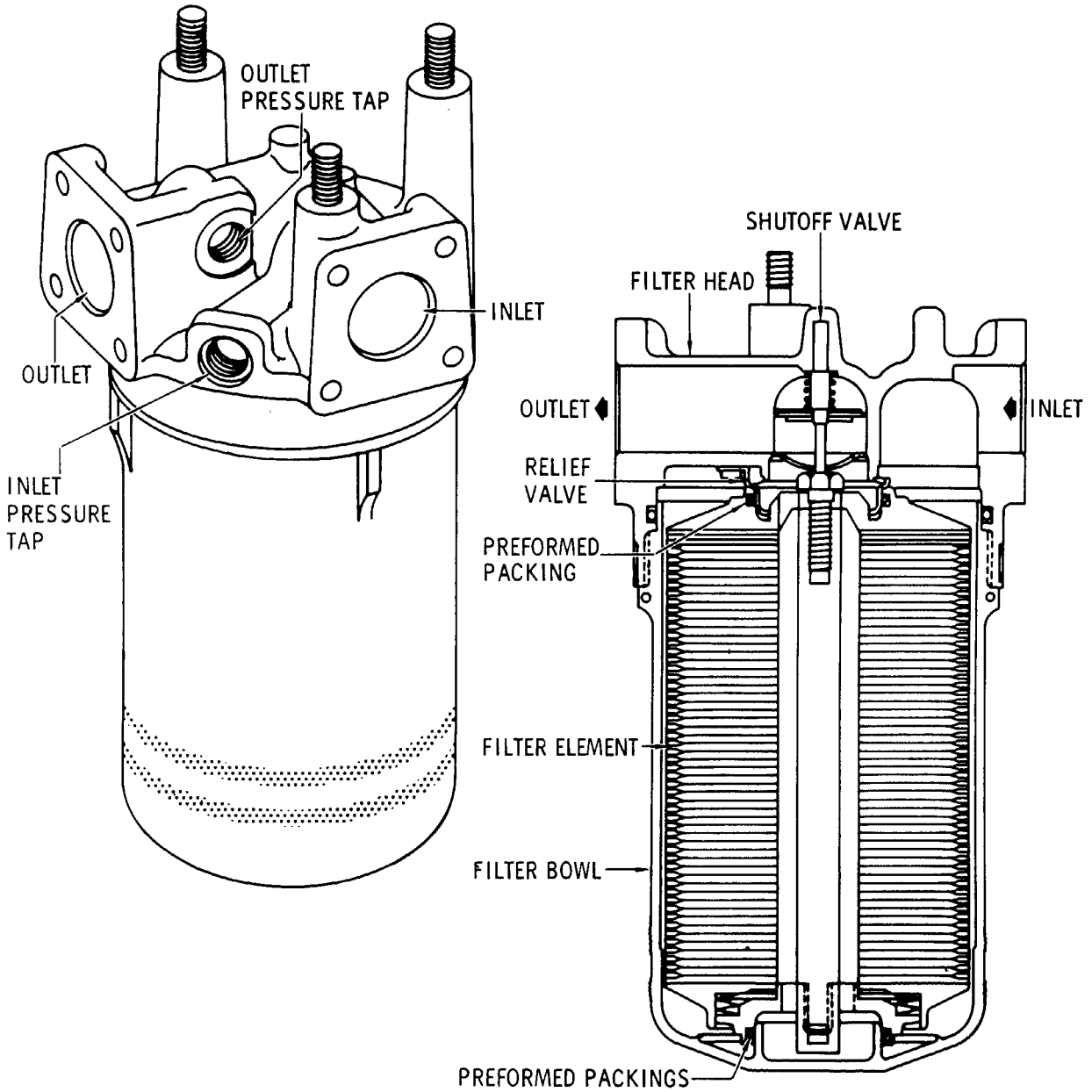
Chip Detector Installation
Figure 005



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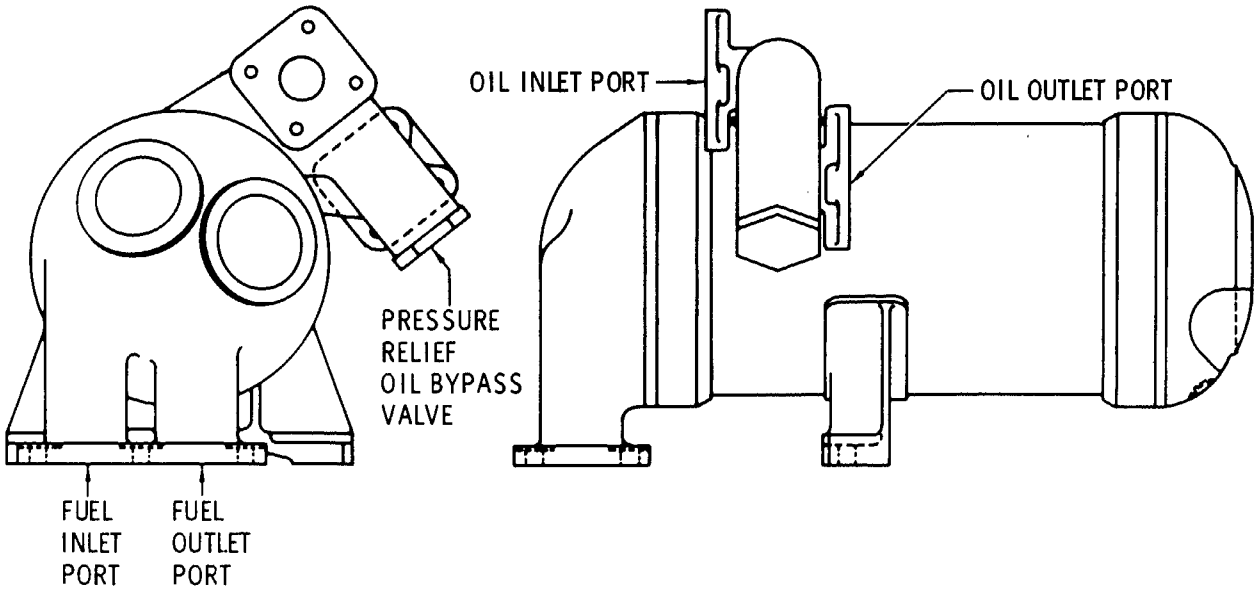
Scavenge Filter
Figure 006



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CF8-6021-01-C

Fuel Oil Heat Exchanger
Figure 007

3. Oil Seal Pressurization Sub System

A. General (Ref. Fig. 003)

(1)The oil seal pressurization sub-system consists of the following components :

(a)Pressurization air ports.

(b)Pressurization distribution passages and lines.

(c)Sump cavity seals.

(d)Sump low pressure cavity and piping.

(2)Operation

(a)Pressurization air is extracted from the low pressure compressor discharge air. The pressurization and cooling airflow for the sump seals is extracted at the leading edge of five fan frame struts in the core flowpath. The fan frame pressurization is directed internally in the frame to each end of the "A" sump, to the compressor bore cooling system, and to the forward fan mid shaft cooling system.

(b)The "B-C" sump pressurization air is externally piped through a line that connects to the "B" sump pressurization cavity outer wall. The pressurization air is then directed internally through the sump pressurization cavity to the forward and aft ends of the sump.

(c)Part of the "B-C" sump pressurization air is directed through orifices in the high pressure compressor rear stub shaft for the purpose of providing additional air to cool the fan mid shaft. This cooling air is carried aft through the intershaft annular cavity where it discharges to the TRF vent cavity.

(d)The "D" sump (turbine rear frame) is a nonvented configuration eliminating the need for low temperature seal pressurization air. Since very little air leaks into the sump, the high temperature TRF vent cavity air can be used to maintain the sump internal pressure. Oil leakage is controlled by means of a windback and chopper in addition to the sump labyrinth air seal.

LUBE AND SCAVENGE PUMP - REMOVAL/INSTALLATION

1. General
The following procedures are to be used when performing maintenance on the lube and scavenge pump. Access to the lube and scavenge pump is gained by opening the fan reverser.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B. Material No.C02-019	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
C. Material No.C02-058	Anti-Seize compounds, Lubricants, Oils (Ref. 70-00-00)
D. Material No.C04-002	Cleaning Compounds and Solvents (Ref. 70-00-00)
E. Material No.C04-004	Cleaning Compounds and Solvents (Ref. 70-00-00)
F. Material No.C04-030	Cleaning Compounds and Solvents (Ref. 70-00-00)
G.	Corrosion-Resistant Steel Lockwire
Referenced Procedures	
- 71-00-00, P. Block 501	Power Plant - General
- 71-13-00, P. Block 301	Cowl Doors

3. Procedure

A. Job Set-Up
Open, safety and tag the appropriate circuit breakers and open fan cowl doors (Ref. 71-13-00, P. Block 301).

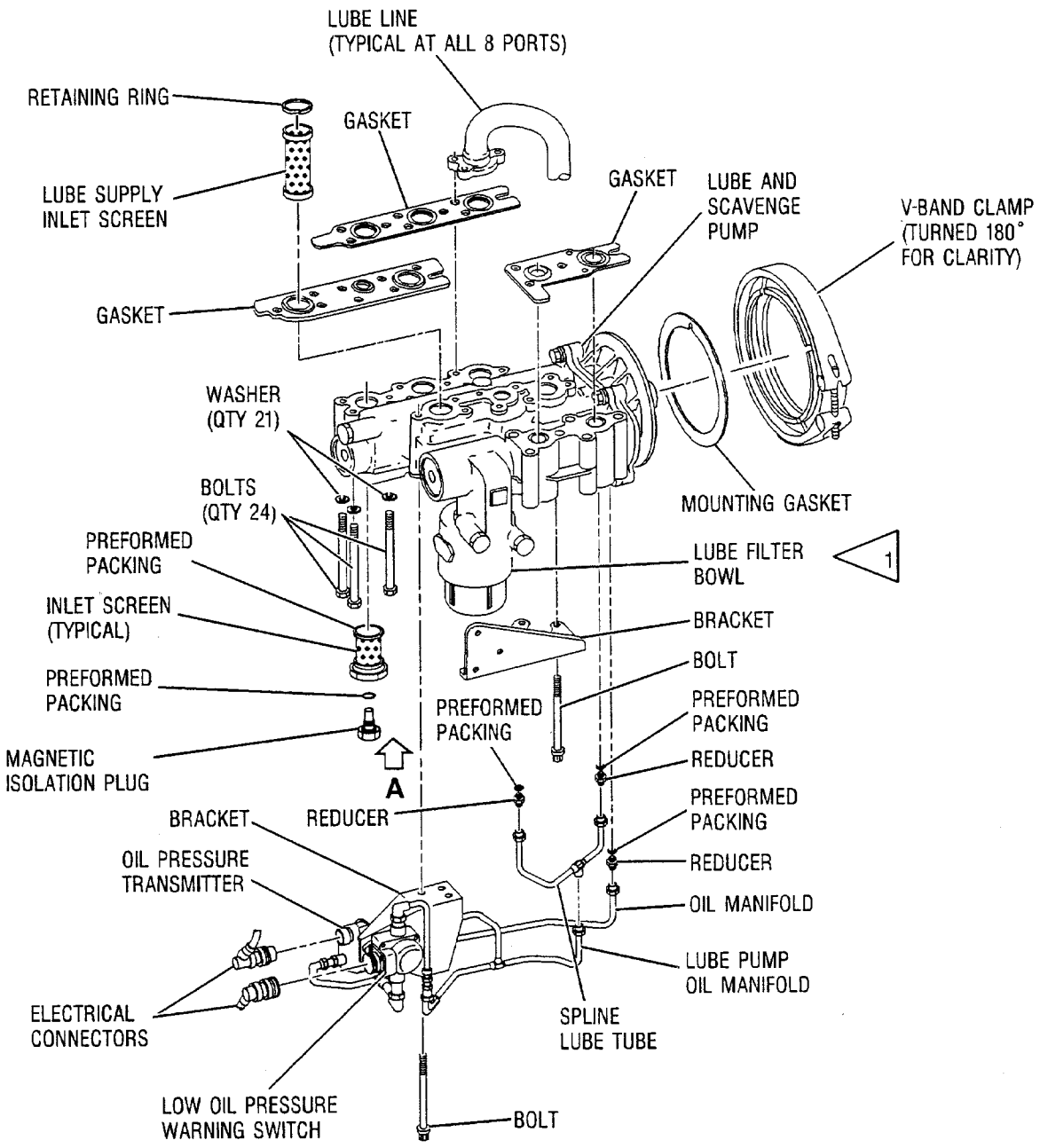
B. Removal (Ref. Fig. 401)
(1)Drain oil system as follows :
(a)Remove safetywire and remove drain plug from oil tank and drain tank.
(b)Install plug ; TORQUE to between 540 and 600 lbf.in. (6.10 and 6.78 m.daN) and wirelock.
(c)Remove all 5 magnetic isolation plugs from the bottom of the pump and drain pump. Remove preformed packings from magnetic isolation plugs and discard preformed packings.
(2)Disconnect electrical connectors from oil pressure transmitter and low oil pressure warning switch. Install protective covers on all electrical connectors.
(3)Disconnect the oil manifold from the lube and scavenge pump.
(4)Disconnect the spline lube tube from the lube pump oil manifold.
(5)Remove 3 bolts that attach the oil pressure transmitter and low oil pressure warning switch bracket to the LUBE SUPPLY IN port on the lube and scavenge pump.
(a)Remove the bracket, oil pressure transmitter, low oil pressure warning switch, oil manifold, and lube pump oil manifold as an assembly.

(6)Remove 3 bolts and 3 washers that attach the bracket to the AGB SCAV IN port on the lube and scavenge pump. Remove the bracket.
(7)Remove 3 bolts and 3 washers that attach the bracket to the TGB SCAV IN port on the lube and scavenge pump. Remove the bracket.
NOTE : Four of the bolts and washers that attach the lube lines to the top of the lube and scavenge pump interfere with tubes when you try to remove them (Ref. Fig. 401) (flagnote 2). Keep these 4 bolts with the lube and scavenge pump during removal.
(8)Remove the remaining 15 bolts and washers that attach the lube lines to the top of the lube and scavenge pump.
(9)Remove 3 gaskets from the top of the lube and scavenge pump. If gaskets are not damaged, keep for installation.
CAUTION : SUPPORT PUMP DURING REMOVAL OF V-BAND CLAMP TO AVOID DAMAGE TO PUMP SHAFT AND SPLINE.
(10)Remove safetywire and disconnect V-band clamp bolt, spread clamp and remove pump from gearbox flange. Discard mounting gasket. Retain gaskets from scavenge and supply ports for reuse.
(11)Remove the spline lube tube from the lube and scavenge pump.
(12)Remove 3 reducer fittings from the bottom of the lube and scavenge pump. Remove preformed packings from reducer fittings and discard the preformed packings.
(13)Install protective covers on all open ports.

C. Installation (Ref. Fig. 401)
(1)Remove protective covers from lube and scavenge pump ports.
(2)Lubricate 3 new preformed packings with engine oil (Material No.C02-019) and install on 3 reducers.
(3)Install 3 reducers in bottom of lube and scavenge pump. TORQUE reducers to between 135 and 155 lbf.in. (1.53 and 1.75 m.daN).
(4)Install spline lube tube on bottom of lube and scavenge pump. TORQUE spline lube tube B-nuts to between 270 and 300 lbf.in. (3.05 and 3.39 m.daN).
(5)Lubricate 5 new preformed packings with engine oil (Material No.C02-019) and install on 5 magnetic isolation plugs.
(6)Install 5 magnetic isolation plugs in the following lube and scavenge pump ports : "C" Scavenge, "B" Scavenge, "TGB SCAV IN", "AGB SCAV IN", and "D" Scavenge.
(7)TORQUE the magnetic isolation plugs to between 75 and 85 lbf.in. (0.85 and 0.96 m.daN).
(8)Install bracket assembly that contains the oil pressure transmitter, low oil pressure warning switch, oil manifold, and lube pump oil manifold on the LUBE IN port on the bottom of the lube and scavenge pump.
(9)Connect B-nut on oil manifold to reducer on bottom of lube and scavenge pump. TORQUE the B-nut to between 270 and 300 lbf.in. (3.05 and 3.39 m.daN).
(10)Connect B-nut on lube pump oil manifold to spline lube tube. TORQUE the B-nut to between 135 and 155 lbf.in. (1.53 and 1.75 m.daN).
NOTE : Four of the bolts and washers that attach the lube lines to the top of the lube and scavenge pump interfere with the tubes when you try to remove them (Ref. Fig. 401) (flagnote 2). To aid installation, these 4 bolts may be taped in place while installing

the lube and scavenge pump.
(11)Spread V-band clamp and slip over gearbox mounting flange.
(12)Place lube and scavenge pump mounting gasket over flange. Hang gasket slot over locating dowel pin at the 12 o'clock position.
(13)Install pump onto AGB mount pad making sure that pump locating dowel pin enters the hole in gearbox flange. Make sure that the pump splines are correctly aligned with the gearbox splines.
(14)Position V-band clamp over pump and gearbox flanges with bolt head facing down and located at 3 o'clock position (viewed from forward looking aft).
(15)Tap rim of clamp with plastic mallet to seat clamp properly and distribute tension while tightening the bolt. TORQUE to between 70 and 90 lbf.in. (0.79 and 1.02 m.daN) and wirelock.
(16)Position 3 gaskets on top of the lube and scavenge pump with the label side face down and the slot at the aft end of the pump.
(17)Install 3 bolts from the bottom side of the lube and scavenge pump through the bracket assembly at the LUBE IN port and into the lube line on the top of the pump.
(a)Tighten the bolts with your fingers.
(18)Install 3 bolts and 3 washers from the bottom side of the lube and scavenge pump through the bracket at the AGB SCAV IN port and into the lube line on the top of the pump.
(a)Tighten the bolts with your fingers.
(19)Install 3 bolts and washers from the bottom side of the lube and scavenge pump through the bracket at the TGB SCAV IN port and into the lube line on the top of the pump.
(a)Tighten the bolts with your fingers.
(20)Install the remaining 15 bolts and washers from the bottom side of the lube and scavenge pump and into the lube lines on the top of the pump.
(a)Tighten the bolts with your fingers.
(21)TORQUE all 24 bolts on the bottom of the lube and scavenge pump to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN).
(22)Connect the electrical connectors to the oil pressure transmitter and low oil pressure warning switch.
(23)Fill oil tank with approved engine oil (C02-019).
(24)Dry motor engine for 3-5 minutes to purge lube system of air.
(25)Perform test as indicated in "Type of testing after engine component replacement" (Ref. 71-00-00, P. Block 501).
NOTE : This step may be performed during aircraft or engine ground checks.
(26)Fill tank to full mark.

D. Removal and Cleaning of Inlet Screens (Ref. Fig. 401)
NOTE : Six 26-mesh screens are located in the lube and scavenge pump inlet ports, five accessed from the bottom of the pump and one accessed from the top of the pump. The size of the screens differ.
(1)Remove the scavenge inlet screens and preformed packings from the bottom of the lube and scavenge pump at the following locations :
(a)Accessory gearbox scavenge inlet
(b)D-sump scavenge inlet
(c)C-sump scavenge inlet



1 GE SERVICE BULLETIN 79-047 DOES NOT USE THE LUBE FILTER. SERVICE BULLETIN 79-047 USES A NEW LUBE AND SCAVENGE PUMP ASSEMBLY THAT DOES NOT HAVE THE LUBE SUPPLY FILTER AND BYPASS AND SERVICE SHUT-OFF VALVES.

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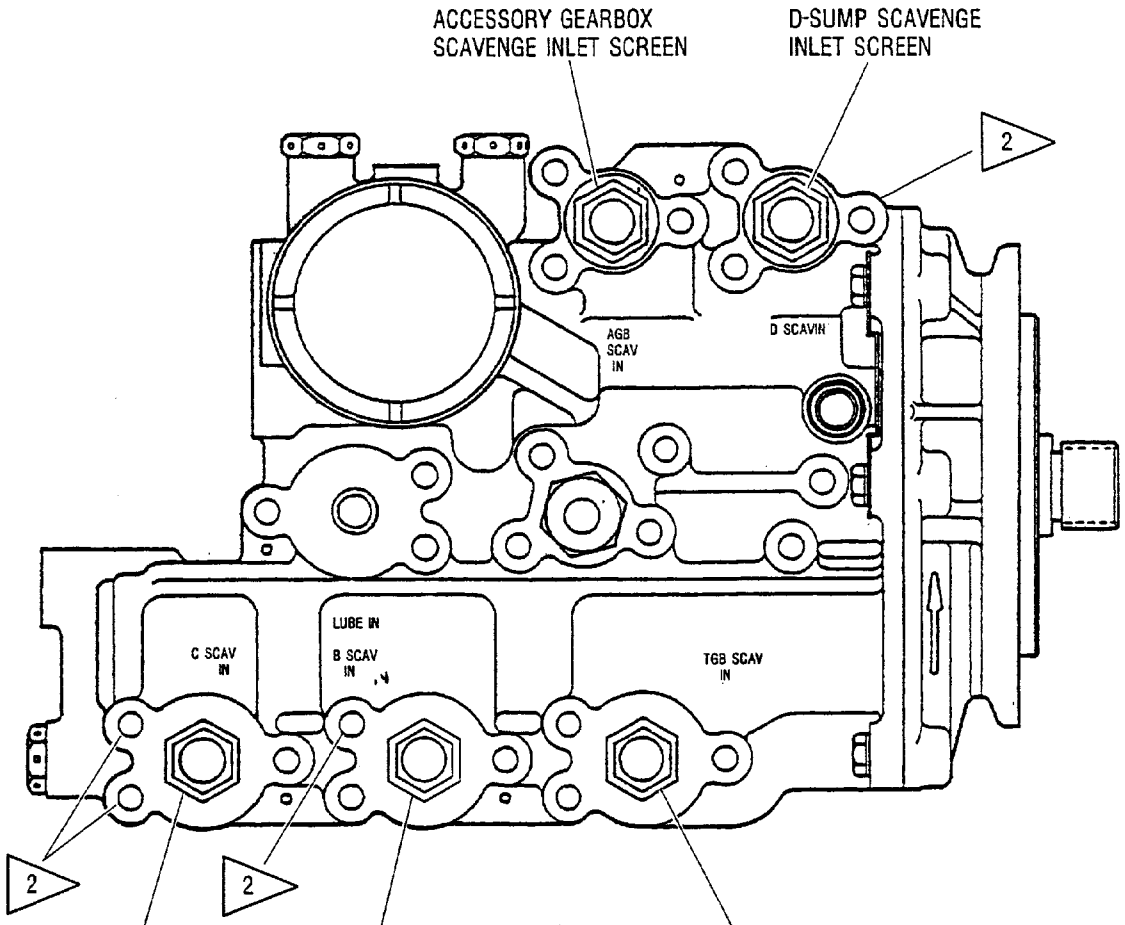
Lube and Scavenge Pump (Sheet 1/2)
Figure 401



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Lube and Scavenge Pump (Sheet 2/2)
Figure 401

(d)B-sump scavenge inlet
(e)Transfer gearbox scavenge inlet
(2)Remove the preformed packings from the scavenge inlet screens and discard.
NOTE : Remove the lube supply inlet screen from the lube supply port only if the lube scavenge filter has been bypassed or a main bearing failure has occurred.
(3)Remove the retaining ring from the lube supply port on the top of the lube and scavenge pump. Remove the lube supply inlet screen from the lube supply port.
(4)Examine all removed inlet screens for debris and damage. Straighten inlet screens and correct seat surface.
WARNING : DO NOT LET TRICHLOROETHANE TOUCH YOU.
ALSO, MAKE SURE YOU HAVE A GOOD FLOW OF CLEAN AIR.
THIS MATERIAL IS VERY DANGEROUS TO YOU SKIN, EYES AND LUNGS.
(5)Clean the removed inlet screens with a brush and 1,1,1 Trichloroethane Solvent (Material No.C04-030) and let dry.

E. Installation of Inlet Screens (Ref. Fig. 401)
(1)Lubricate preformed packings for the accessory gearbox scavenge inlet screen and D-sump scavenge inlet screen with engine oil and install on the correct inlet screen.
(2)Install the accessory gearbox scavenge inlet screen and D-sump scavenge inlet screen in the bottom of the lube and scavenge pump and TORQUE to between 150 and 170 lbf.in. (1.69 and 1.92 m.daN).
(3)Lubricate preformed packings for the transfer gearbox scavenge inlet screen, B-sump scavenge inlet screen, and C-sump scavenge inlet screen with engine oil and install on the correct inlet screen.
(4)Install the transfer gearbox scavenge inlet screen, B-sump scavenge inlet screen, and C-sump scavenge inlet screen in the bottom of the lube and scavenge pump and TORQUE to between 150 and 170 lbf.in. (1.69 and 1.92 m.daN).
(5)If the lube supply inlet screen was removed install as follows :
(a)Install the lube supply inlet screen in the lube supply port on top of the lube and scavenge pump.
(b)Install the retaining ring in the groove in the lube supply port. Make sure the ring is correctly engaged in the groove.

F. Removal of Magnetic Isolation Plug
CAUTION : DURING REMOVAL AND INSTALLATION OF MAGNETIC CHIP DETECTORS, USE TWO WRENCHES : ONE TO HOLD THE SCAVENGE SCREEN STATIONARY, AND ANOTHER TO TURN THE MAGNETIC CHIP DETECTOR.
(1)Remove plug, and discard preformed packing.

G. Installation of Magnetic Isolation Plug
(1)Check plug (magnetic isolation plug) for cleanliness.
CAUTION : INSTALLATION OF THE PLUG (MAGNETIC ISOLATION PLUG) WITHOUT A PREFORMED PACKING CAN RESULT IN EXCESSIVE OIL LOSS DURING ENGINE OPERATION, WITH POSSIBLE ENGINE FAILURE.
(2)Lubricate new preformed packing with Material No.C02-019 and install on plug (magnetic isolation plug).

NOTE : If a new preformed packing is not available the existing preformed packing may be reused provided inspection confirms part serviceability.

(3)Install plug (magnetic isolation plug) ; TORQUE to between 75 and 85 lbf.in. (0.85 and 0.96 m.daN).

H. Removal of Lube Filter

(1)Remove filter bowl from the forward end of the pump by using a strap wrench.
(2)Remove preformed packing from groove in bowl and discard.
(3)Remove filter element from bowl.

I. Installation of Lube Filter

(1)Place clean filter element into bowl.
(2)Lubricate new preformed packing and sealing surfaces of filter bowl and housing with engine oil (C02-019).
(3)Install preformed packing in groove in filter bowl and install bowl.
(4)Turn bowl with your hand. Tighten it one-quarter to one-half turn past where the lube filter bowl preformed packing contacts the filter bowl.

J. Close-Up and Test

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close fan cowl door and close circuit breakers for the appropriate engine (Ref. 71-13-00, P. Block 301).
(3)Perform test as indicated in "Type of testing after engine component replacement" (Ref. 71-00-00, P. Block 501).

LUBE AND SCAVENGE PUMP - INSPECTION CHECK

1. General

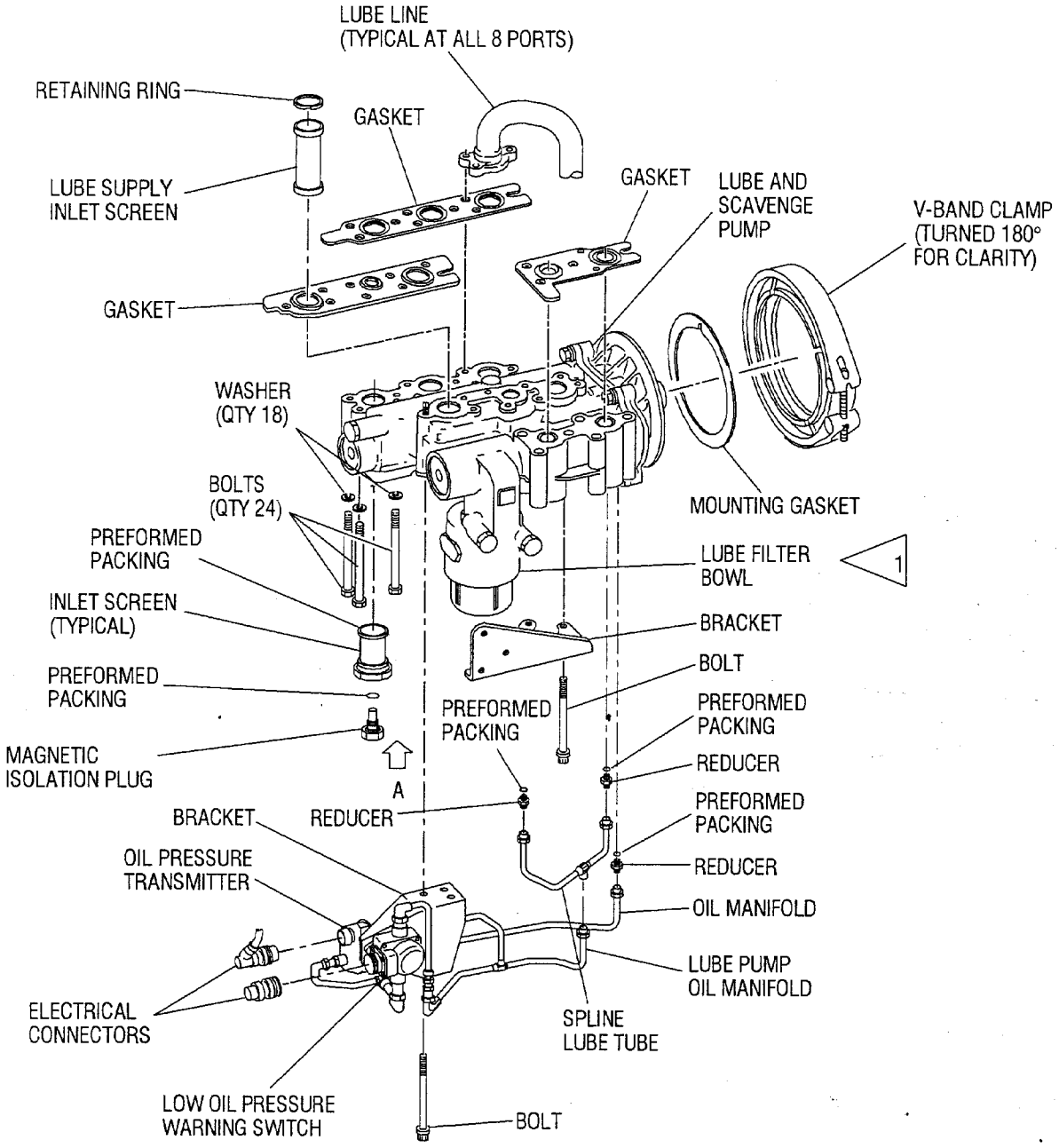
A. The following procedures are to be used when inspecting the lube and scavenge pump, inlet screens, magnetic isolation plugs and lube supply inlet screen. Access is gained by opening the fan reverser.

2. Procedure

A. Job Set-Up
(1)Remove scavenge inlet screens, magnetic isolation plugs and lube supply inlet screen (Ref. 79-21-01, P. Block 401).

B. Inspection/Check
(1)Examine the scavenge inlet screens, magnetic isolation plugs, and lube supply inlet screeb (Ref. Fig. 601).
CAUTION : EXAMINE THE MAGNETIC ISOLATION PLUGS AND SCREENS FOR UNWANTED MATERIAL. IF YOU FIND UNWANTED MATERIAL, LOOK FOR THE CAUSE AND CORRECT THE PROBLEM BEFORE YOU OPERATE THE ENGINE. IF YOU DO NOT OBEY THIS PROCEDURE YOU CAN CAUSE DAMAGE TO THE ENGINE.
(a)Write the quantity and the type of the unwanted material in a record.
(2)Make sure the applicable screen is straight, is not damaged, and is correctly engaged.

C. Close-Up
(1)Install the scavenge inlet screens, magnetic isolation plugs and lube supply inlet screen (Ref. 79-21-01, P. Block 401).



1 GE SERVICE BULLETIN 79-047 DOES NOT USE THE LUBE FILTER. SERVICE BULLETIN 79-047 USES A NEW LUBE AND SCAVENGE PUMP ASSEMBLY THAT DOES NOT HAVE THE LUBE SUPPLY FILTER AND BYPASS AND SERVICE SHUT-OFF VALVES.

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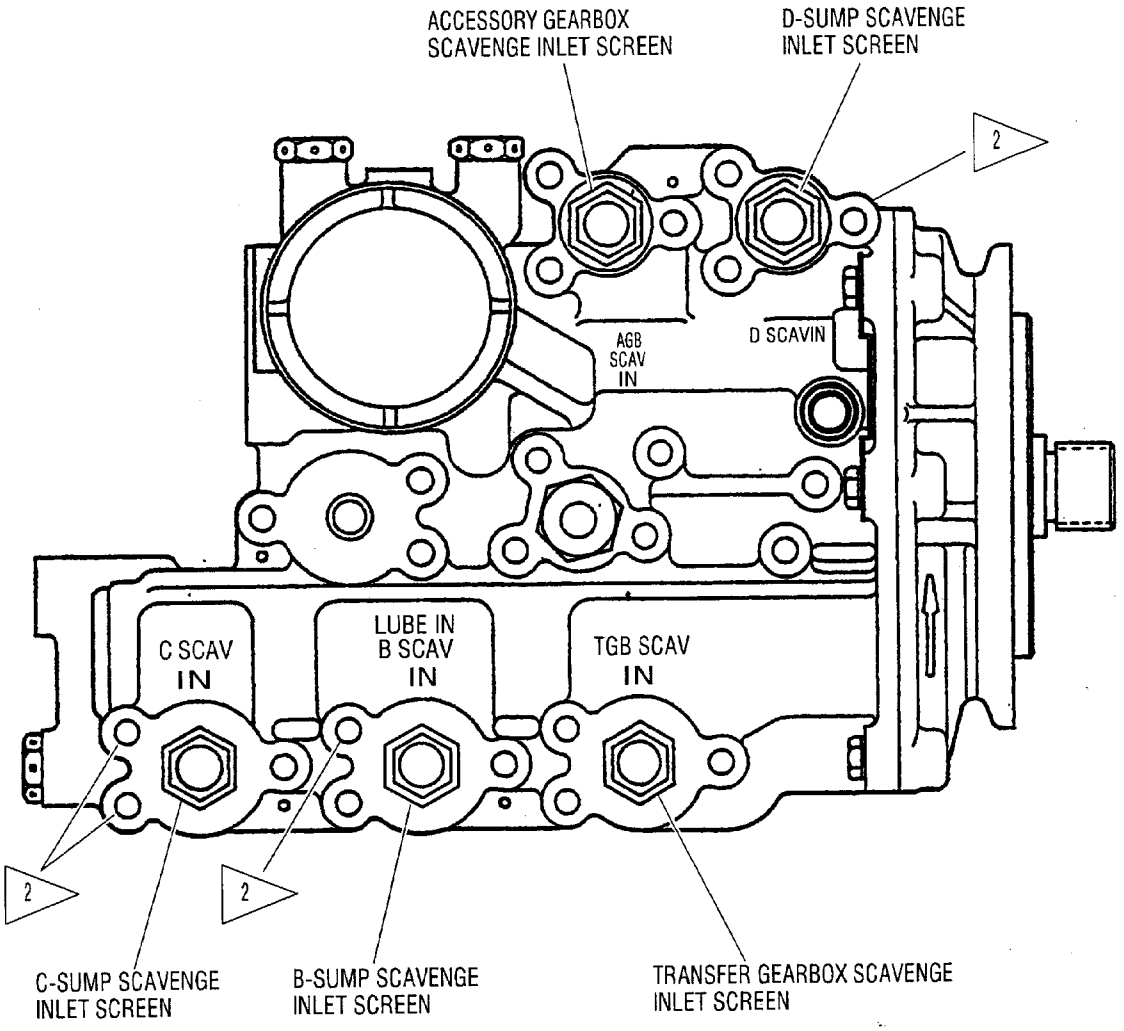
Lube and Scavenge Pump (Sheet 1/2)
Figure 601



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Lube and Scavenge Pump (Sheet 2/2)
Figure 601

SCAVENGE OIL FILTER - REMOVAL/INSTALLATION

1. General

The following procedures are to be used when removing of installing the scavenge oil filter, which is located at 4 o'clock on the fan case (aft looking forward). Access to the filter assembly is gained by opening the right fan cowl.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B. Material No.C02-019	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
C.	Corrosion Resistant Steel Lockwire
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 71-00-00, P. Block 501	Power Plant - General

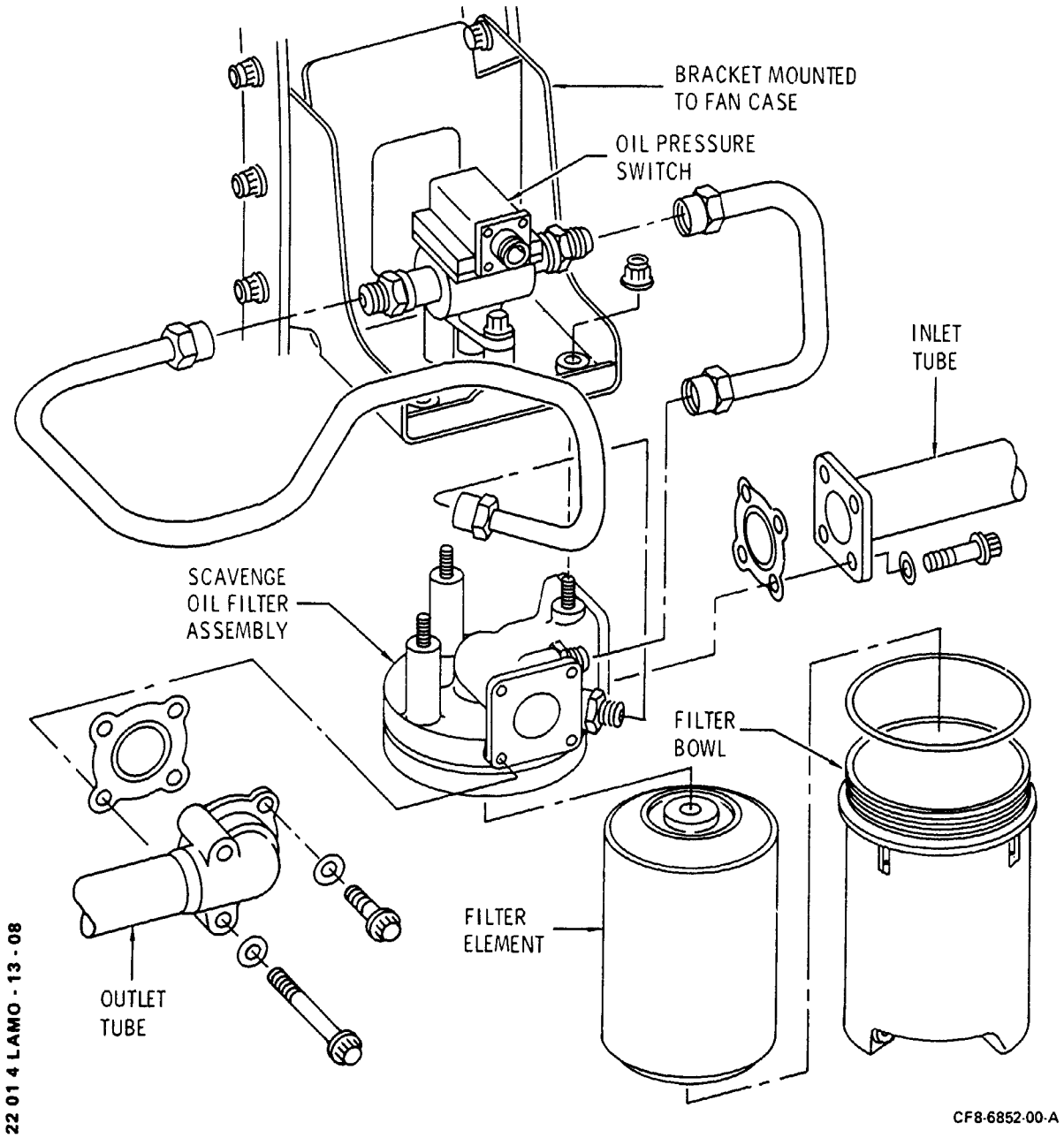
3. Procedure

A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open the fan cowl doors (Ref. 71-13-00, P. Block 301).

B. Removal (Ref. Fig. 401)
(1)Disconnect differential switch oil tubes at the oil filter head.
(2)Disconnect discharge port tube from the filter assembly by removing the 4 attaching bolts and washers. Retain gasket if serviceable.
(3)Disconnect inlet port tube from the filter assembly by removing the 4 attaching bolts and washers. Retain gasket if serviceable.
(4)Remove 3 nuts from base of mounting bracket and remove filter assembly.
(5)Install protective covers where necessary.

C. Installation (Ref. Fig. 401)
(1)Install filter assembly on mounting bracket and secure with washers and nuts. TORQUE nuts to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN).
(2)Replace gasket on discharge port and connect discharge tube to filter using washers and bolts. TORQUE bolts to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN).
(3)Place gasket on inlet port of filter and connect inlet tube to filter using washers and bolts. TORQUE bolts to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN).
(4)Install differential switch oil tubes. TORQUE B-nuts to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN).

D. Removal of Filter Element
(1)Remove filter bowl by using a strap wrench.
(2)Remove filter element and preformed packing from the groove in the bowl.



Scavenge Oil Filter
Figure 401

E. Installation of Filter Element
(1)Place clean filter element in bowl.
NOTE : Install new element, open end up, in bowl.
(2)Lubricate new preformed packing and sealing surfaces of filter bowl and housing with engine oil (C02-019).
(3)Install preformed packing in groove in filter bowl and install bowl.
(4)Turn bowl until hand tight and wirelock.

F. Test and Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove safety clips and tags and close circuit breakers.
(3)Perform idle leak check (Ref. 71-00-00, P. Block 501).
(4)Service oil tank with oil (C02-019).
(5)Close fan cowl doors (Ref. 71-13-00, P. Block 301).

SCAVENGE OIL FILTER - INSPECTION/CHECK

1. General

A. The following procedures are to be used when inspecting the scavenge oil filter which is located on the right side of the aft fan case at the 4 o'clock position. Access is gained by opening the right fan cowl.

2. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 79-22-01, P. Block 401	Scavenge Oil Filter

3. Procedure

A. Job Set-Up
(1)Remove scavenge oil filter (Ref. 79-22-01, P. Block 401).

B. Inspection/Check

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(1)Studs for :		
(a)Looseness	Not permitted	Replace stud
(b)Threads for damage	Up to 50 percent of one thread or 10 percent each of 2 threads after removal of high metal	Replace stud
(2)Filter head/Bowl for :		
(a)Dents and scratches on sealing surfaces	Any amount providing they do not extend across seal surface after removal of high metal	Replace filter head/ bowl
(b)Threads for damage	Up to 50 percent of one thread or 10 percent each of 2 threads after removal of high metal	Replace filter head/ bowl
(3)Leakage	None allowed	Replace preformed packings as required
(4)Filter element for :		
(a)Contamination	None allowed	Replace filter element

C. Close-Up

(1)Install scavenge oil filter (Ref. 79-22-01, P. Block 401).

FUEL/OIL HEAT EXCHANGER - REMOVAL/INSTALLATION

1. General

This procedure pertains to the removal and installation of the Fuel/Oil Heat Exchanger mounted on the Main Fuel Pump which is mounted on the aft right side of the accessory gearbox. Access to the heat exchanger is gained by opening the right thrust reverser.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Torque Wrench 55-130 lbf.in. (0.6 - 1.5 m.daN)
C. Material No.C02-021	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 71-00-00, P. Block 501	Power Plant - General
- 12-13-79, P. Block 1	Engine Lubricating Oil

3. Procedure

A. Job Set-Up

(1) Open, safety and tag the appropriate circuit breakers and open the fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

B. Removal (Ref. Fig. 401)

(1) Remove 8 bolts and washers securing tubes to oil in and oil out ports of heat exchanger.

(2) Remove 8 self-locking nuts and washers securing heat exchanger to fuel pump. Remove heat exchanger and gaskets.
NOTE : Removed gaskets are reusable if serviceable.

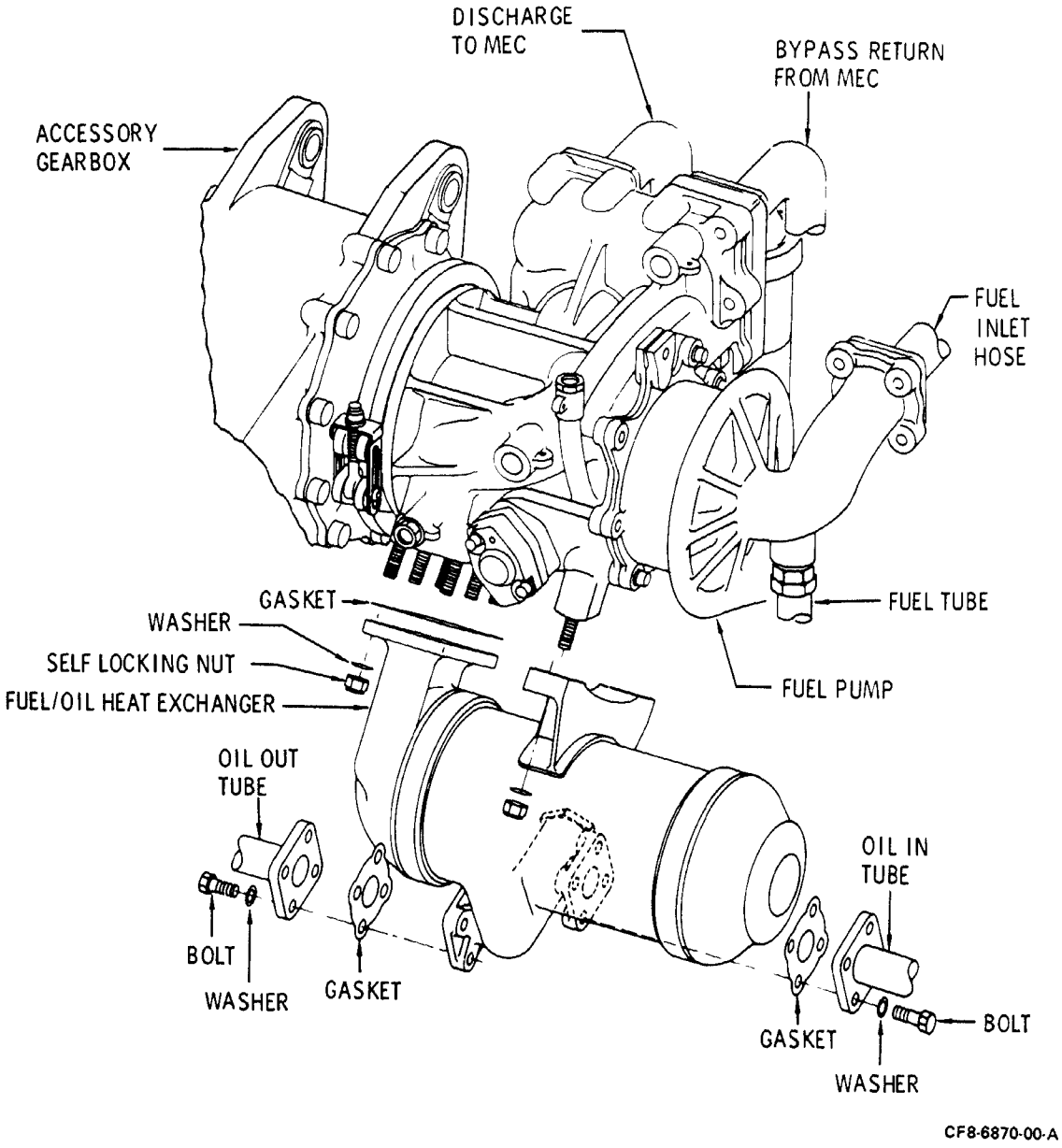
(3) To flush the internal areas of the heat exchanger, put Material No.C02-021 into the ports and the revolving unit. Install the protective covers on all of the flange surfaces.
NOTE : Oil wetting of the internal surfaces of the heat exchanger is an important precaution against atmospheric corrosion damage. Corrosion damage can be a result if moist air or water touches the heat exchanger internal surfaces.

C. Installation of Fuel/Oil Heat Exchanger (Ref. Fig. 401)

(1) Install gasket and heat exchanger on fuel pump studs. Secure with 8 washers and self-locking nuts. TORQUE nuts to between 100 and 130 lbf.in. (1.1 and 1.5 m.daN).

(2) Install gaskets and connect tubes to oil in and oil out ports of heat exchanger with 4 washers and bolts. TORQUE bolts to between 55 and 70 lbf.in. (0.6 and 0.8 m.daN).

D. Close-Up and Test



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Fuel/Oil Heat Exchanger - Removal/Installation
Figure 401

(1)Perform test as indicated in "Type of testing after engine component replacement" (Ref. 71-00-00, P. Block 501).
(2)Check engine oil level, service if required (Ref. 12-13-79, P. Block 1).
NOTE : Remove the fuel/oil heat exchanger for repair or replacement if the engine oil quantity increases. Drain and flush the oil system before you do the idle check again.
(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(4)Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).

FUEL/OIL HEAT EXCHANGER - INSPECTION/CHECK

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

2. Procedure

A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

B. Inspection /Check

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMIT	REMARKS
(1)Evidence of leakage	None allowed	Replace heat exchanger
(2)Cracks	None allowed	Replace heat exchanger

C. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers.

MAGNETIC PLUG - REMOVAL/INSTALLATION

1. General

This procedure pertains to the removal and installation of the Master Chip Detector. The chip detector is an "assembly" consisting of a magnetic probe and housing. It is located on the oil scavenge manifold in the accessory gearbox compartment at the 6:30 o'clock position. Access to the Master Chip Detector is gained by opening the left fan reverser cowl.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Container Suitable for Oil
C.	Corrosion Resistant Steel Lockwire
D. Material No.C02-019	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
E. Material No.C04-004	Cleaning Compounds and Solvents (Ref. 70-00-00)

Referenced Procedures

- 71-13-00, P. Block 301	Cowl Doors
- 71-00-00, P. Block 501	Power Plant

3. Procedure

A. Job Set-Up

(1)Open, safety and tag circuits breakers for the appropriate engine and open the fan cowl doors (Ref. 71-13-00, P. Block 301).

B. Removal of Master Chip Detector

(1)Configuration 1 (Ref. Fig. 401)

(a)Place container under master chip detector to catch residual oil.

(b)Cut and remove lockwire securing master chip detector to housing.

(c)Remove master chip detector from threaded housing.

NOTE : Normal resistance will be felt from preformed packing friction. A self-closing valve prevents oil loss when plug is removed under static conditions.

(d)Remove preformed packing from master chip detector and discard.

(2)Configuration 2 (Ref. Fig. 402)

(a)Place container under the master chip detector to catch residual oil.

CAUTION : THE MAGNETIC PLUG IS LOCKED IN THE HOUSING BY A BAYONET PIN AND SLOT ARRANGEMENT. THE PLUG MUST BE PUSHED IN BEFORE TURNING. REPLACE ENTIRE MASTER CHIP DETECTOR ASSEMBLY IF PLUG CANNOT BE REMOVED BY HAND. DO NOT USE TOOLS TO REMOVE PLUG.

(b)Push in knurled knob and turn counterclockwise, pull master chip detector from housing.

NOTE : Normal resistance will be felt from preformed packing friction.

A self-closing valve prevents oil loss when plug is removed.

(c)Remove preformed packing from master chip detector and discard.

C. Removal of the Master Chip Detector Housing

(1)All configurations (Ref. Fig. 401, 402)

(a)Place a container under the housing to catch any oil left in the scavenge lines.

(b)Cut and remove lockwire securing housing.

(c)Remove housing from threaded scavenge line.

(d)Remove preformed packing from housing and discard.

D. Installation of Master Chip Detector Housing

(1)All configurations (Ref. Fig. 401, 402)

WARNING : THIS SOLVENT IS TOXIC AND SHOULD BE USED WITH ADEQUATE VENTILATION. AVOID PROLONGED BREATHING OF VAPORS. REPEATED OR PROLONGED CONTACT WITH THE SKIN WILL REMOVE OILS AND CAUSE SEVERE DERMATITIS.

(a)Check housing for cleanliness. Use trichloroethylene (C04-004) if necessary to clean prior to installation.

CAUTION : FAILURE TO INSTALL PREFORMED PACKING CAN RESULT IN EXCESSIVE OIL LOSS DURING ENGINE OPERATION, WITH POSSIBLE ENGINE FAILURE.

(b)Lubricate a new preformed packing with engine oil (C02-019) and install in groove on housing.

(c)Install housing into scavenge line and TORQUE to between 90 and 100 lbf.in. (1.02 and 1.63 m.daN).

(d)Wirelock housing.

E. Installation of Master Chip Detector

(1)Configuration 1 (Ref. Fig. 401)

WARNING : THIS SOLVENT IS TOXIC AND SHOULD BE USED WITH ADEQUATE VENTILATION. AVOID PROLONGED BREATHING OF VAPORS. REPEATED OR PROLONGED CONTACT WITH THE SKIN WILL REMOVE OILS AND CAUSE SEVERE DERMATITIS.

(a)Check master chip detector for cleanliness. Use trichloroethylene (C04-004) if necessary to clean prior to installation.

CAUTION : FAILURE TO INSTALL PREFORMED PACKING CAN RESULT IN EXCESSIVE OIL LOSS DURING ENGINE OPERATION, WITH POSSIBLE ENGINE FAILURE.

(b)Lubricate a new preformed packing with engine oil (C02-019) and install in the groove of the master chip detector as close as possible to the head.

(c)Install master chip detector into housing and TORQUE to between 40 and 50 lbf.in. (0.45 and 0.56 m.daN).

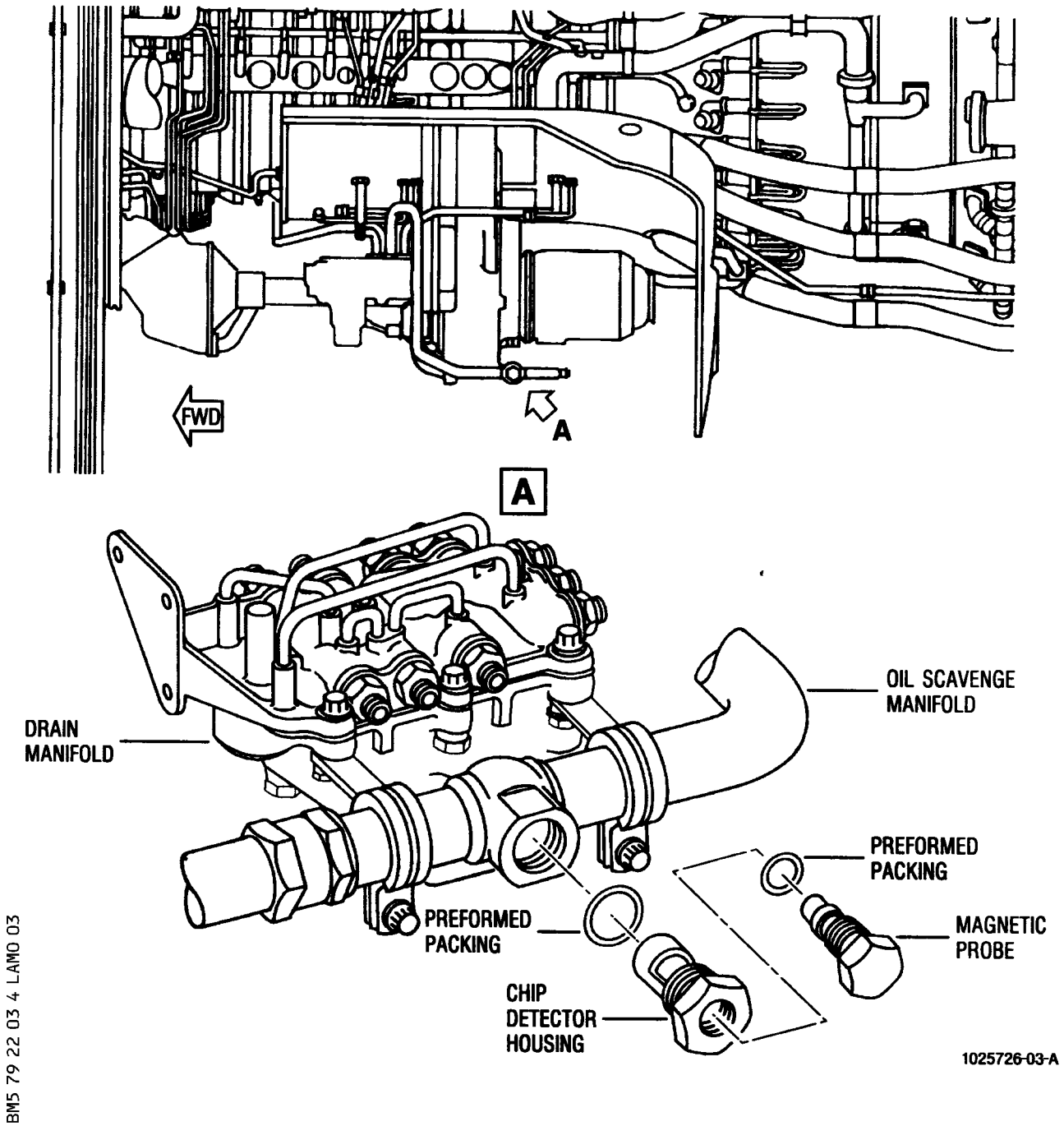
(d)Wirelock master chip detector.

(2)Configuration 2 (Ref. Fig. 402)

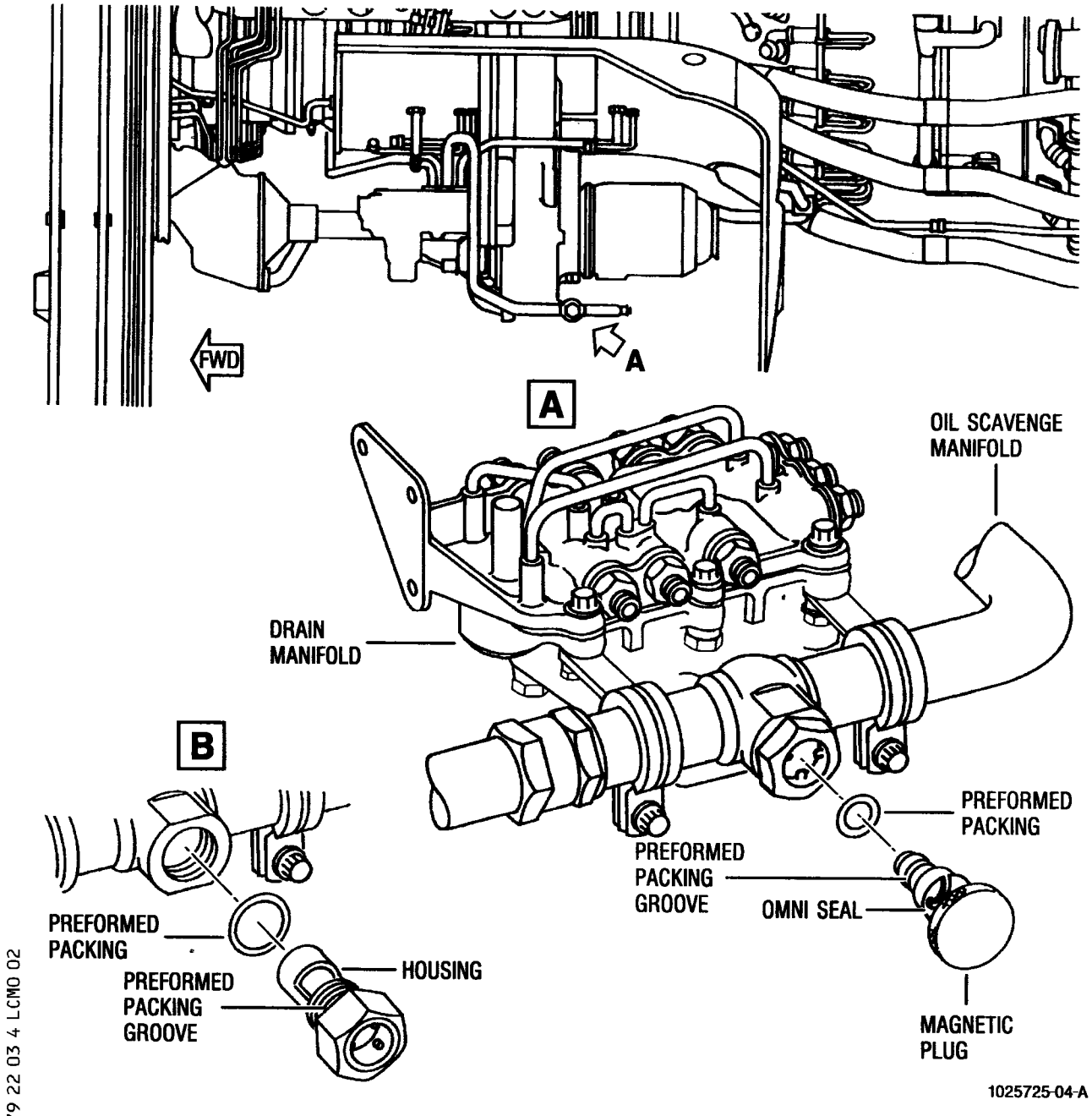
WARNING : THIS SOLVENT IS TOXIC AND SHOULD BE USED WITH ADEQUATE VENTILATION. AVOID PROLONGED BREATHING OF VAPORS. REPEATED OR PROLONGED CONTACT WITH THE SKIN WILL REMOVE OILS AND CAUSE SEVERE DERMATITIS.

(a)Check master chip detector for cleanliness. Use trichloroethylene (C04-004) if necessary to clean prior to installation.
CAUTION : FAILURE TO INSTALL PREFORMED PACKING CAN RESULT IN EXCESSIVE OIL LOSS DURING ENGINE OPERATION, WITH POSSIBLE ENGINE FAILURE.
(b)Lubricate a new preformed packing with engine oil (C02-019) and install in the groove of the chip detector.
(c)Insert master chip detector in housing by pushing and rotating clockwise to engage pins in slot detent and release.
(d)Check for positive locking of detector by pulling outward on detector.

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove safety clips and tags and close circuit breakers. Close fan cowl doors (Ref. 71-13-00, P. Block 301).



Magnetic Plug (Configuration 1)
Figure 401

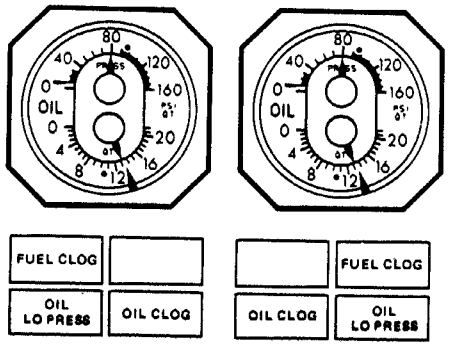


Magnetic Plug (Configuration 2)
Figure 402

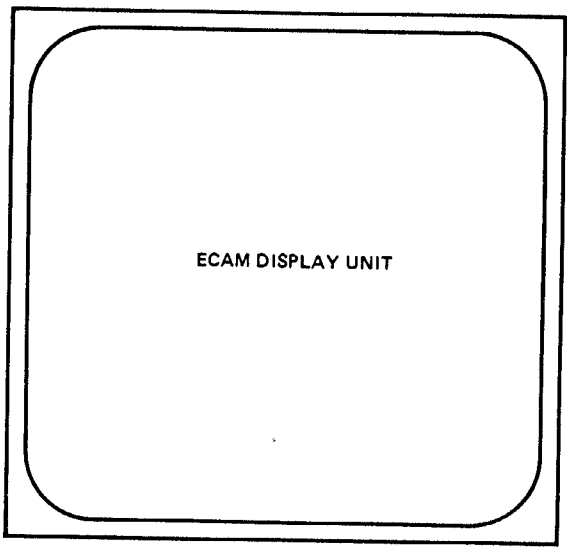
INDICATING - DESCRIPTION AND OPERATION

1. General (Ref. Fig. 002)
(Ref. Fig. 001)
The following oil system parameters and warnings are displayed to the crew for monitoring purpose :
- Oil quantity on indicator
- Oil pressure on indicator
- Oil low pressure warning (red color) associated with **MASTER WARN** lights.
- Oil filter clogging caution (amber color) associated with **MASTER CAUTION** lights.

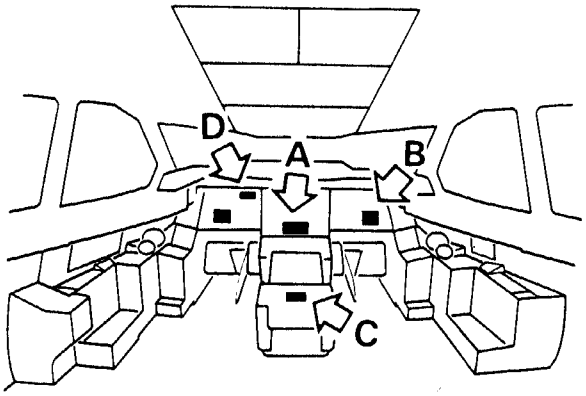
Oil quantity, oil pressure and oil temperature are displayed on the **ECAM** display unit **ENGINE** page either at the crew demand, or automatically during certain flight phases (Ref. 31-52).
(Ref. Fig. 003)

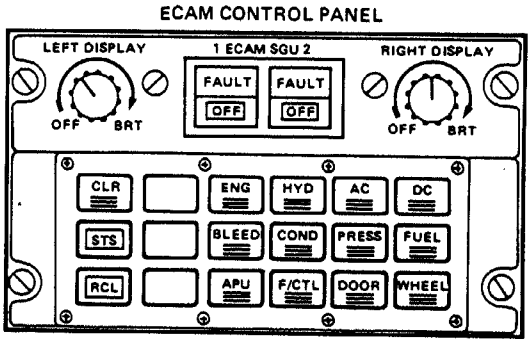


A



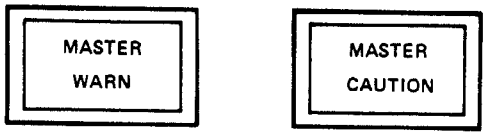
B





C

D



BM5 79 30 00 0 LAGO - 20 - 15
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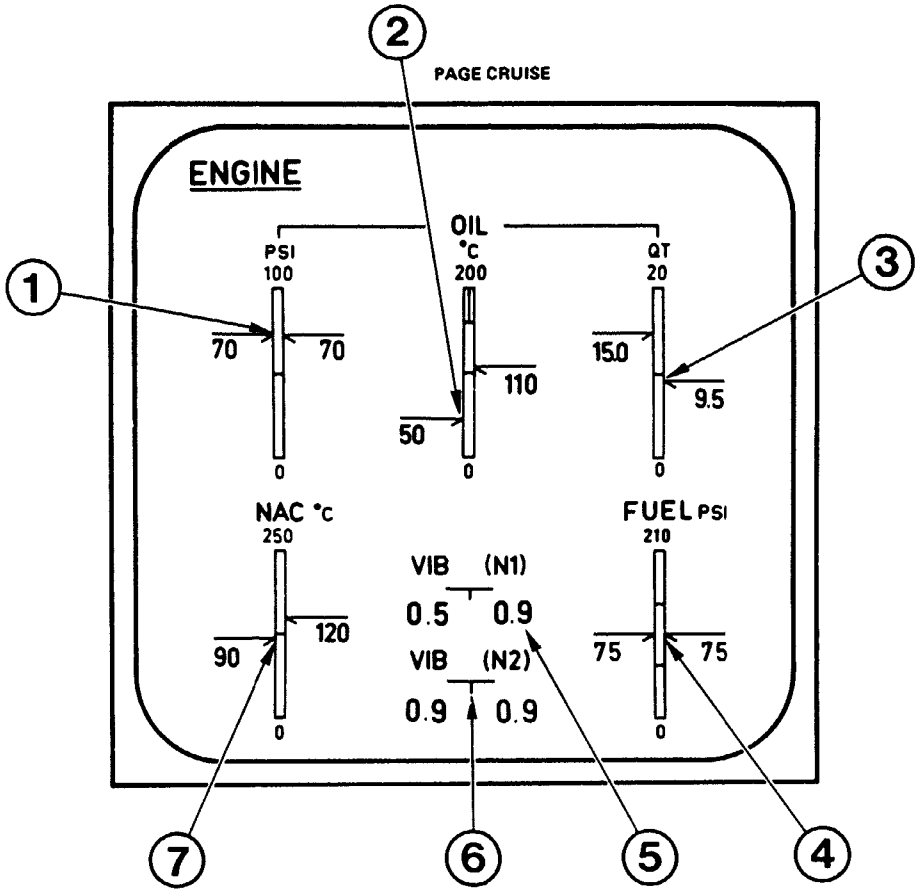
Component Location - Indication
Figure 001

R EFFECTIVITY: 001-100,

PIA



ADVISORY

1 - OIL PRESSURE (G)
FLASHES WHEN P ≥ 90 PSI or P ≤ 20 PSI
(R) WHEN P ≤ 10 PSI

2 - OIL TEMPERATURE (G)
FLASHES WHEN t ≥ 160° C
(A) WHEN t ≥ 175° C

3 - OIL QUANTITY (G)
FLASHES WHEN QUANTITY ≤ 2 QTS
(CORRESPONDS TO 6 QUARTS IN THE OIL TANK)

4 - FUEL PRESSURE (G)
FLASHES WHEN PRESSURE ≤ 50 PSI

5 - ENGINE VIBRATION (N1) (G)
FLASHES WHEN VIBRATION ≥ 3 UNITS

6 - ENGINE VIBRATION (N2) (G)
FLASHES WHEN VIBRATION ≥ 5 UNITS

7 - NACELLE TEMPERATURE (G)
FLASHES WHEN t ≥ 185° C + TAT
NOT DISPLAYED DURING STARTING SEQUENCE
(REPLACED BY BLEED PRESSURE INDICATION)

BM5 79 30 00 0 LCMO - 14 - 09
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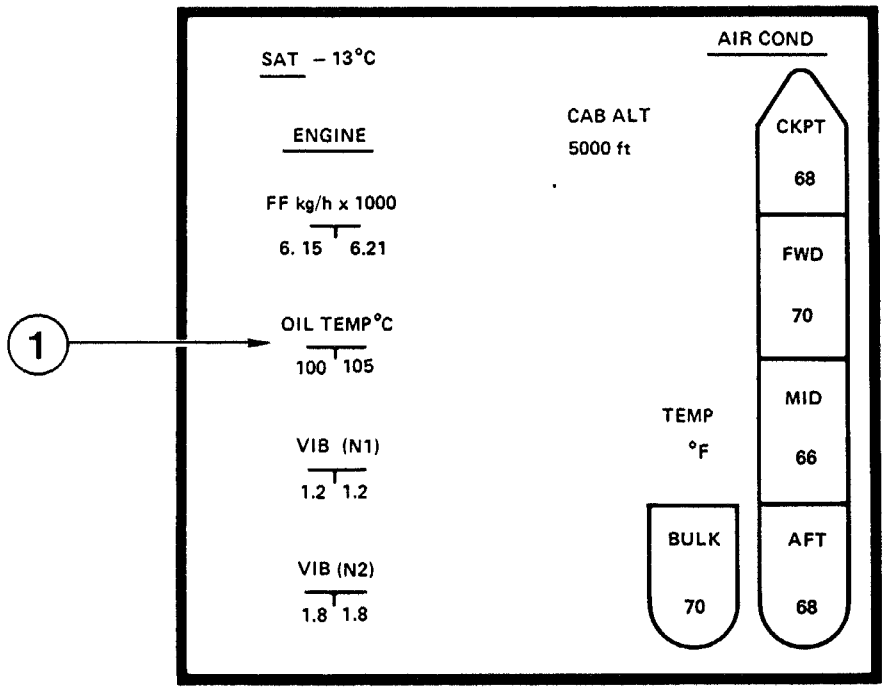
CRT System Display
Figure 002



CRUISE PAGE

1. · OIL TEMPERATURE (G)
FLASHES WHEN t°≥ 160 °C
(A) WHEN t°≥ 175 °C

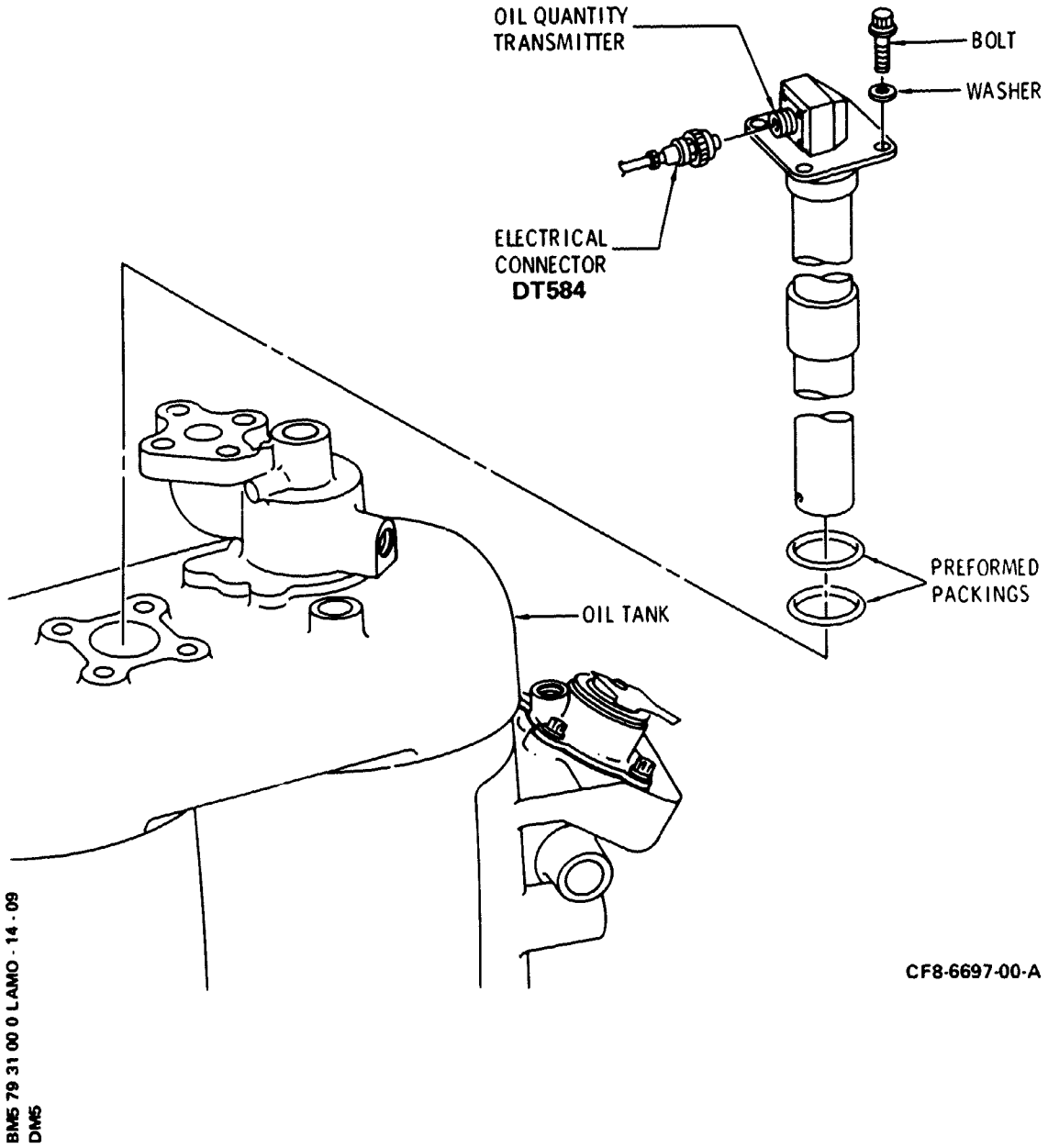
BM5 79 30 00 0 LENO - 25 - 18
DM5

CRT System Display
Figure 003

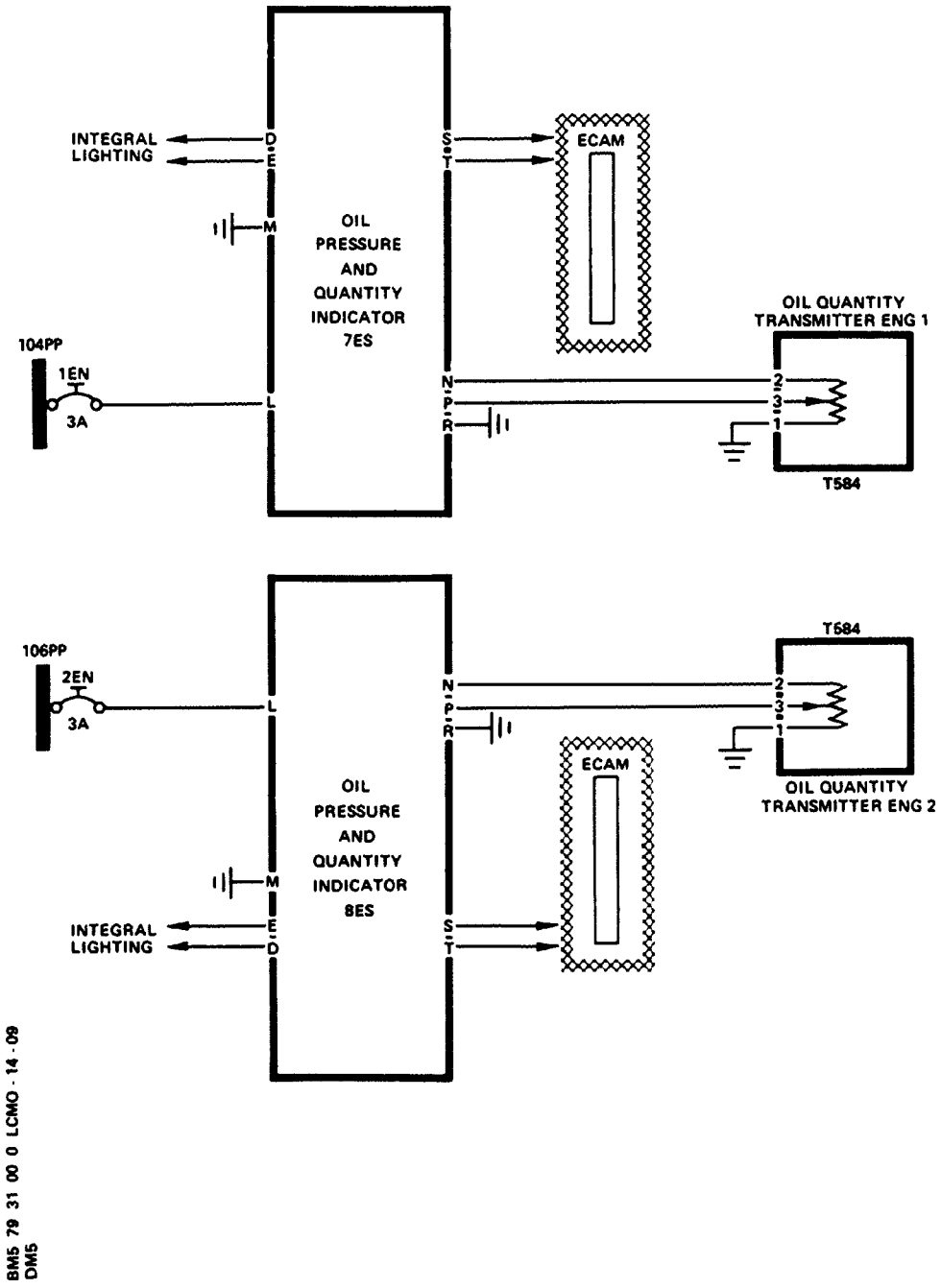
OIL QUANTITY INDICATING - DESCRIPTION AND OPERATION

1. Oil Quantity Transmitter (Ref. Fig. 001)
   The oil quantity transmitter is located in the oil tank.
   It is power supplied through the oil quantity indicator. An output voltage proportional to oil quantity is returned for flight compartment indication.
   The transmitter has a tube reaching the full height of tank interior where the oil surface can exist. A float follows the oil surface level causing a change in circuit resistance as it moves. The output voltage thereby varies with the oil level in the tank.

2. Oil Quantity Indications (Ref. Fig. 002)
   The signal from the transmitter is sent to the analogical indicator 7ES (8ES) (graduated from 0 to 22 quarts, accuracy ± 2 %).
   This indicator has a peripheral index enabling oil consumption to be checked (the normal consumption is 0.27 l/h).
   A recopy of the indicator is sent to the system data analog converter (SDAC) which converts the analogical signal into a digital form and displays it on the ECAM display unit via the symbol generator unit (SGU).
   If the engine page is displayed this signal gives the oil quantity on a vertical scale graduated from 0 to 20 quarts (accuracy ± 1 %).
   The indicator is located on the main instrument panel (4VU). This indicator features a test switch (BITE) located on the back and enabling oil pressure and quantity measurement channels to be tested.
   The values to be obtained during this test are marked by blue dots on the indicator dial (pressure 95 psi and oil quantity 10.5 quarts U.S.).



Oil Quantity Transmitter
Figure 001



Oil Quantity Indicator - Electrical Circuit
Figure 002

OIL QUANTITY INDICATING - ADJUSTMENT/TEST

1. Functional Test

A. Reason for the Job

This procedure provides instructions for the engine oil quantity indicating system. The test consists in draining and adding known quantities of oil in tank for comparison.

B. Equipment and Materials

ITEM	DESIGNATION
(1)Material No.C02-019	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
Referenced Procedures	
- 12-13-79, P. Block 1	Engine Lubricating Oil
- 24-41-00, P. Block 301	AC External Power Control
- 71-13-00, P. Block 301	Cowl Doors
- 79-11-00, P. Block 401	Oil Tank

C. Procedure

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

(1)Job Set-Up

(a)Initial conditions
- correct electrical Power Supply
- circuit breakers closed, particularly those associated with ENGINE, ECAM.
- forward Services ventilation system in operation.

(b)On center pedestal, ECAM control panel
- using RIGHT DISPLAY control knob, adjust brightness on right ECAM display unit
- select engine page by pressing ENG pushbutton switch (ENG pushbutton switch light comes on).

(c)Open, safety and tag circuit breakers for the appropriate engine and open fan cowl doors (Ref. 71-13-00, P. Block 301).

(d)Make certain that when turning BITE screw at the back of the indicator, the pointer deflects to indicate 10.5 quarts, at the blue dot.

(e)Drain oil from tank (Ref. 79-11-00, P. Block 401).

(f)Remove oil tank filler cap (Ref. 12-13-79, P. Block 1).

ACTION	RESULT
1. At oil tank	On panel 4VU
R - add 4 quarts US of oil	- oil quantity indicator shows zero
	On ECAM display UNIT
R	- oil quantity indication on ENGINE page shows zero

ACTION	RESULT
- add 5 quarts US of oil	On panel 4VU - oil quantity indicator shows 5 quarts US
	On ECAM display UNIT - oil quantity indication on ENGINE page is 5 quarts US
- add 13 quarts US of oil	On panel 4VU - oil quantity indicator shows 18 quarts US
	On ECAM display UNIT - oil quantity indication on ENGINE page is 18 quarts US
2. On panel 133VU - open circuit breaker 1EN (2EN) - ENGINE/OIL/ENG1 (2)/OIL QTY - close circuit breaker 1EN (2EN)	- oil quantity indicator shows zero - oil quantity indicator shows 18 quarts US

D. Close-Up
(1)Install oil tank filler cap (Ref. 12-13-79, P. Block 1).
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Close fan cowl door (Ref. 71-13-00, P. Block 301).
(4)Remove safety clips and tags and close circuit breakers 1KG, 1JH, 2JH, 1KM and 2KM.
(5)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(6)Restore system and aircraft to normal operating condition.

OIL QUANTITY TRANSMITTER - REMOVAL/INSTALLATION

1. General

A. This procedure provides instructions for removal and installation of the oil quantity transmitter.

B. Access to oil quantity transmitter is through the right fan cowl door.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

3. Procedure

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG1/OIL QTY	1EN	336/Q68
133VU	ENG2/OIL QTY	2EN	336/Q73

(2)Open, safety and tag the appropriate circuit breakers and open right fan cowl door (Ref. 71-13-00, P. Block 301).

B. Removal (Ref. Fig. 401)

(1)Remove oil quantity transmitter as follows :

(a)Disconnect electrical connector from transmitter and install protective covers.

(b)Remove nut and bolt securing cable to bracket.

WARNING : WAIT AT LEAST 5 MINUTES AFTER ENGINE IS SHUTDOWN TO ALLOW TANK PRESSURE TO BLEED OFF BEFORE REMOVING OIL QUANTITY TRANSMITTER. HOT OIL GUSHING FROM TANK COULD CAUSE SEVERE BURNS. PROLONGED CONTACT OF LUBRICATION OIL WITH SKIN CAN CAUSE DERMATITIS. OIL WILL STAIN CLOTHING AND CAN SOFTEN PAINT.

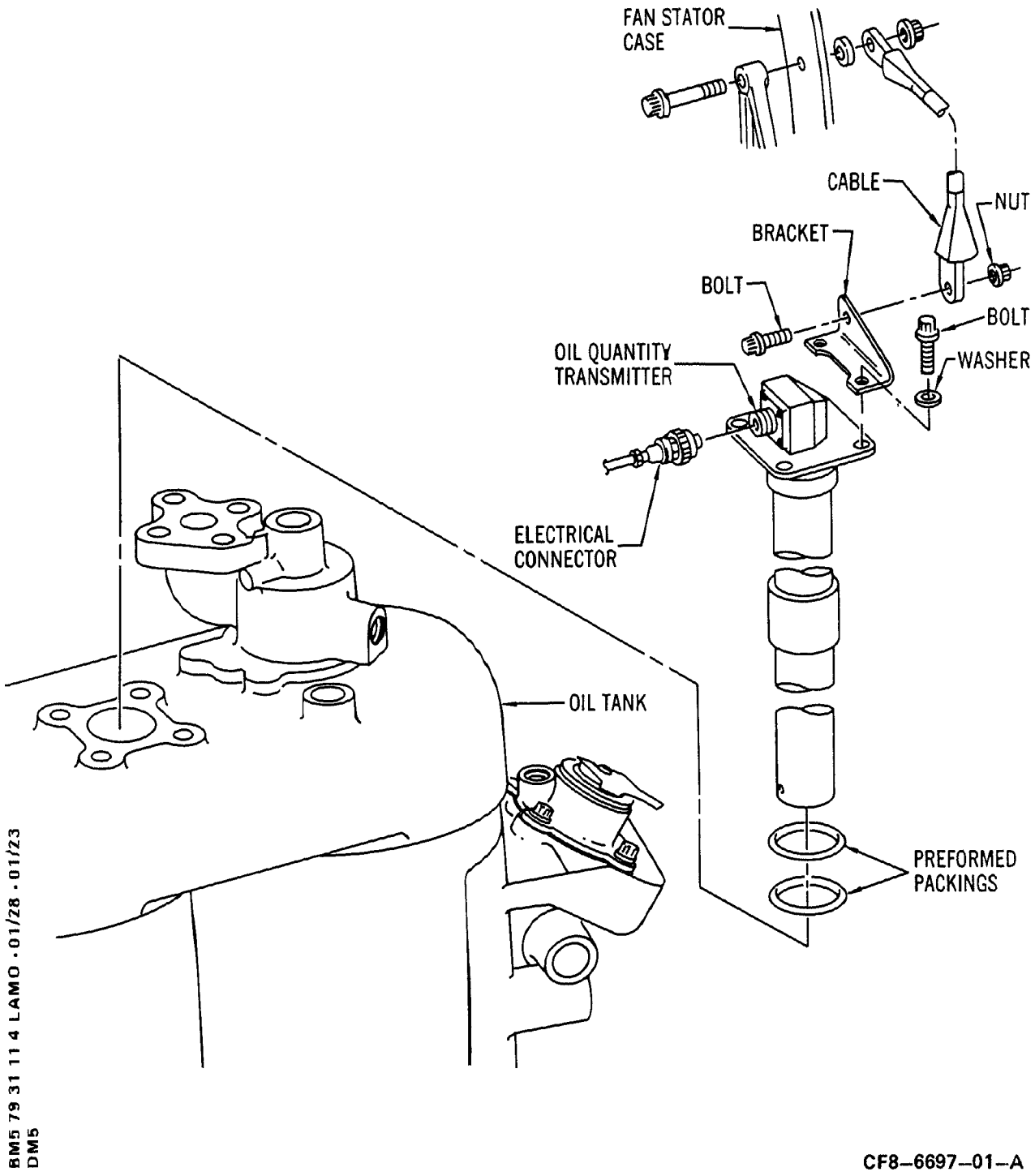
(c)Remove 4 bolts and 4 washers attaching oil quantity transmitter and bracket to oil tank.

(d)Remove transmitter and bracket from oil tank. Remove and discard packings.

(e)Install protective covers on transmitter and transmitter mounting pad.

C. Installation of Oil Quantity Transmitter (Ref. Fig. 401)

(1)Install oil quantity transmitter as follows :



Oil Quantity Transmitter
Figure 401

(a)Remove protective covers from transmitter and transmitter mounting pad.
(b)Lubricate and install new packings on oil quantity transmitter.
(c)Position oil quantity transmitter on oil tank, so that electrical connector faces aft. Check to be sure that transmitter fits into support bracket located at bottom of tank.
NOTE : For installation of new oil quantity transmitter, remove shipping clip prior to installation. Failure to accomplish this will not allow float to move.
(d)Position bracket on transmitter.
(e)Secure oil quantity transmitter and bracket to oil tank with washers and bolts. TORQUE bolts to between 55 and 70 lbf.in. (0.62 and 0.78 m.daN).
(f)Attach cable to bracket using nut and bolt. TORQUE nut to between 55 and 70 lbf.in. (0.62 and 0.78 m.daN).
(g)Remove protective covers from electrical connector and connect electrical connector to transmitter.
Tighten connector fingertight plus one-eighth turn.
(h)Install safetywire to mounting bolts.

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close right fan cowl door. Remove safety clips and tags and close appropriate circuit breakers (Ref. 71-13-00, P. Block 301) together with circuit breakers 1EN and 2EN.

OIL TEMPERATURE INDICATING - DESCRIPTION AND OPERATION

1. General (Ref. Fig. 001, 002)

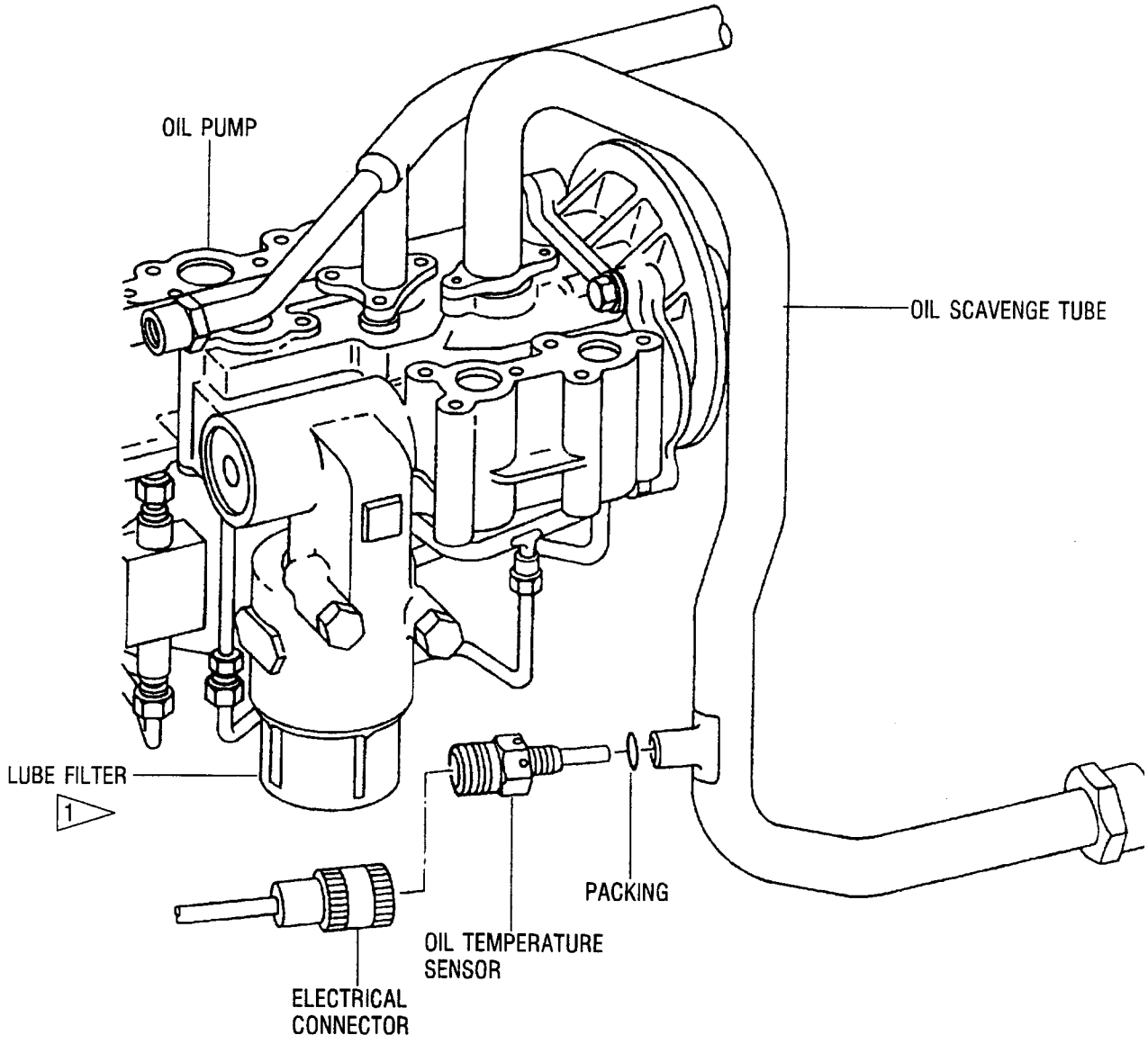
The oil temperature sensor is located in the oil scavenge system.

The sensor contains a resistor which varies nearly linearly according to the temperature. The signal from the sensor is sent to the aircraft (SDAC) where it is transformed into a digital form, then sent to the SGU to be displayed on the ECAM display unit. If the engine page is displayed, this signal gives the oil temperature on a vertical scale graduated from 0 to 200°C (accuracy ± 1%).

The normal scavenge oil temperature is between 71 and 160°C.

On a cold day it may drop down to 57°C.

On a hot day, at high altitude and reduced engine speed, it may reach 175°C (349°F) for a period not exceeding 15 minutes in steady state operation.



1 GE SERVICE BULLETIN 79-047 DOES NOT USE THE LUBE FILTER. SERVICE BULLETIN 79-047 USES A NEW LUBE AND SCAVENGE PUMP ASSEMBLY THAT DOES NOT HAVE THE LUBE SUPPLY FILTER AND BYPASS AND SERVICE SHUT-OFF VALVES.

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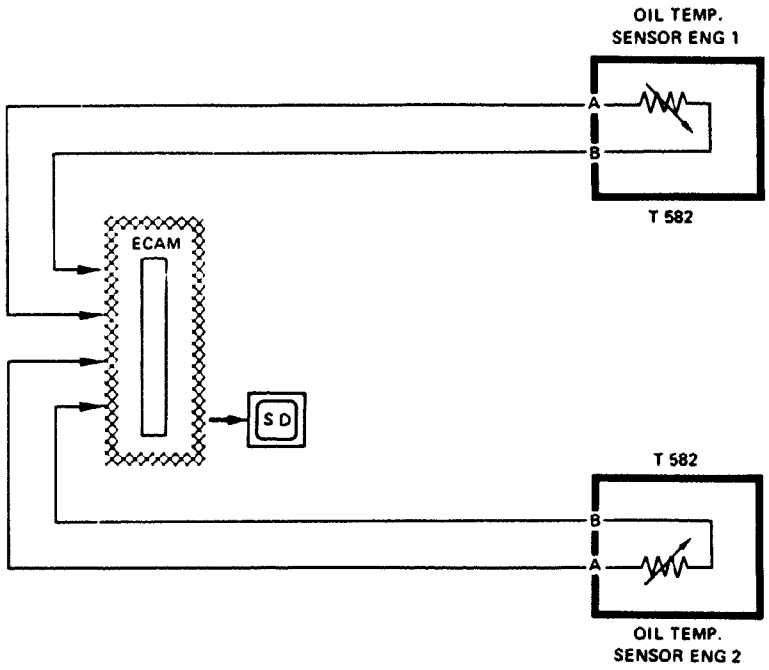
Oil Temperature Sensor
Figure 001



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Oil Temperature Indication - Electrical Circuit
Figure 002

OIL TEMPERATURE SENSOR - REMOVAL/INSTALLATION

1. General

A. This procedure provides instructions for removal and installation of the oil temperature sensor.

B. Access to the oil temperature sensor is through the left fan cowl door.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Braker Safety Clips
B. Material No.C02-023	Anti Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
Referenced Procedure	
- 24-41-00, P. Block 301	AC External Power Control
- 71-00-00, P. Block 501	Power Plant - General
- 71-13-00, P. Block 301	Cowl Doors

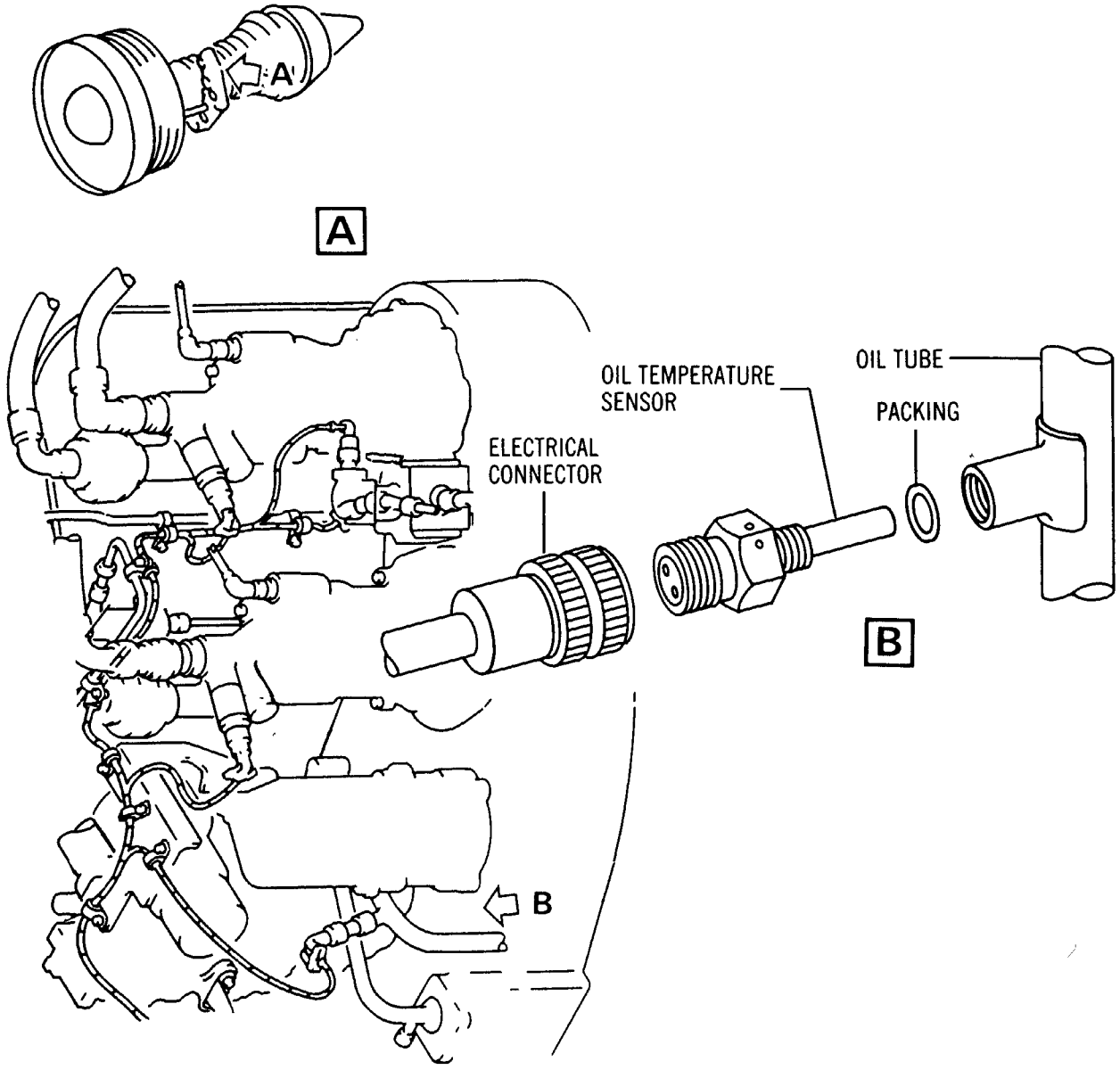
3. Procedure

A. Job Set-Up
(1)Open, safety and tag the appropriate circuit breakers and open fan cowl doors (Ref. 71-13-00, P. Block 301).

B. Remove (Ref. Fig. 401)
(1)Disconnect electrical connector from sensor. Install protective covers on connector and sensor receptacle.
(2)Remove sensor from tee fitting in scavenge oil tube.
Install a protective cover into oil tube port at tee fitting.
(3)Remove and discard packing from sensor.

C. Installation (Ref. Fig. 401)
(1)Remove protective covers from sensor, electrical connector and tube.
(2)Install oil temperature sensor as follows :
(a)Lubricate a new packing with engine oil (C02-023) and install packing on sensor.
(b)Install sensor in scavenge oil tube tee fitting.
TORQUE sensor to between 135 and 150 lbf.in. (1.53 and 1.69 m.daN) and wirelock.
(c)Verify that one interfacial seal is installed in receptacle and connect electrical connector to sensor. Tighten connector fingertight plus one-eighth turn

D. Test
(1)Remove safety clips and tags and close circuit breakers.
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Close circuit breakers. Make sure that the circuit breakers related with



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Oil Temperature Sensor
Figure 401

ENGINE and ECAM are closed.

(4)Make sure that the forward services ventilation system is in operation.

(5)On center pedestal, ECAM control panel :

(a)Using RIGHT DISPLAY control knob, adjust brightness on R ECAM display unit.

(b)On Third Occupant ECAM control panel using RIGHT DISPLAY control knob, adjust brightness of Third Occupant ECAM display unit.

(c)Select ENGINE page by pressing ENG pushbutton switch (ENG pushbutton switch light comes on).

(6)On R ECAM display unit, check that the oil is at ambient temperature.

(7)Operate engine at idle (Ref. 71-00-00, P. Block 501).

(8)Check for leakage at engine and on ECAM display unit and make sure that the temperature increases correctly.

E. Close-Up

(1)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

(2)Make sure that the work area is clean and clear of tools and other items of equipment.

(3)Close left fan cowl door (Ref. 71-13-00, P. Block 301).

OIL PRESSURE AND LOW OIL PRESSURE WARNING - DESCRIPTION AND OPERATION

1. Oil Pressure (Ref. Fig. 001)

A. Oil Pressure Transmitter
The oil pressure transmitter is connected between the lube pump outlet line and the gearbox sump. With power supplied through the indicator, the winding movement results in inductance variation creating an unbalanced bridge circuit. The resultant current variation changes the flight compartment indicator moving coil. The oil pressure actuates the diaphragm against a spring inside the transmitter, causing a winding to move.

B. Low Oil Pressure Switch
A pressure switch is placed in parallel with the oil pressure transmitter. If oil pressure falls below 9.5 psid during engine operation, the switch will close an aircraft crew warning.

C. Oil Filter Delta Pressure Switch
An oil bypass indicator switch is placed across the oil filter. As the oil pressure increases above 33 psid due to the collection of particles in the filter, the switch will close indicating "Oil Clog". The switch will open if the delta pressure is subsequently lowered to 22 psid.

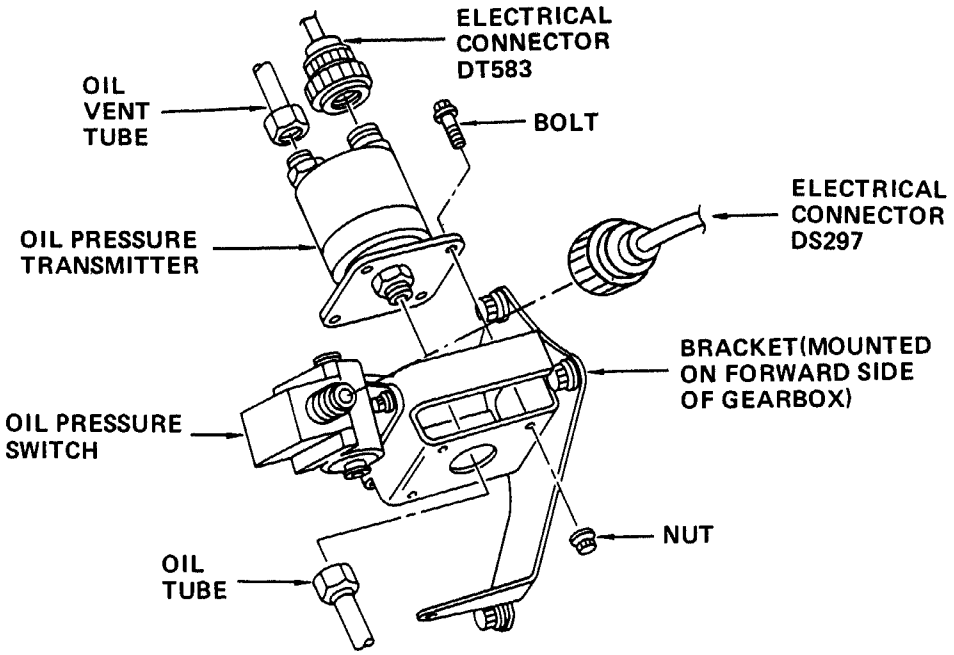
2. Low Oil Pressure Warning (Ref. Fig. 001)

(Ref. Fig. 002)

A. When the oil pressure reaches 0.655 to 0.862 bar (9.5 to 12.5 psi) decreasing, the pressure switch closes, which, if the HP fuel shut off valve is open, causes
- illumination of red OIL LO PRESS warning light 3ES (4ES) on panel 4VU (main instrument panel)
- Illumination of red MASTER WARN Light

- and triggerring of the continuous repetitive chime.
- actuation of L and triggering of ECAM display unit, which will indicate to the crew members the operations to be performed.
- display on the R ECAM display unit of the ENGINE page
- commutation of the electronics rack cooling fan from low speed to high speed (HQ circuit) as soon as oil pressure of one engine drops below 0.655 bar (9.5 psi).

In addition to the above mentioned actions, it causes on ground :
- opening of the cabin outflow valves (HM circuit) when the oil pressure of one engine becomes lower than 0.655 bar (9.5 psi) (the prepressurization sequence does not start when one throttle control lever is moved beyond 22 °).
- cut off of the cockpit voice recorder (RK circuit) five minutes after the oil pressure of the last operating engine has dropped below 0.655 bar (9.5 psi).
- reduction of the public address amplifier (RY circuit) power after the oil pressure of the last operating engine has dropped below



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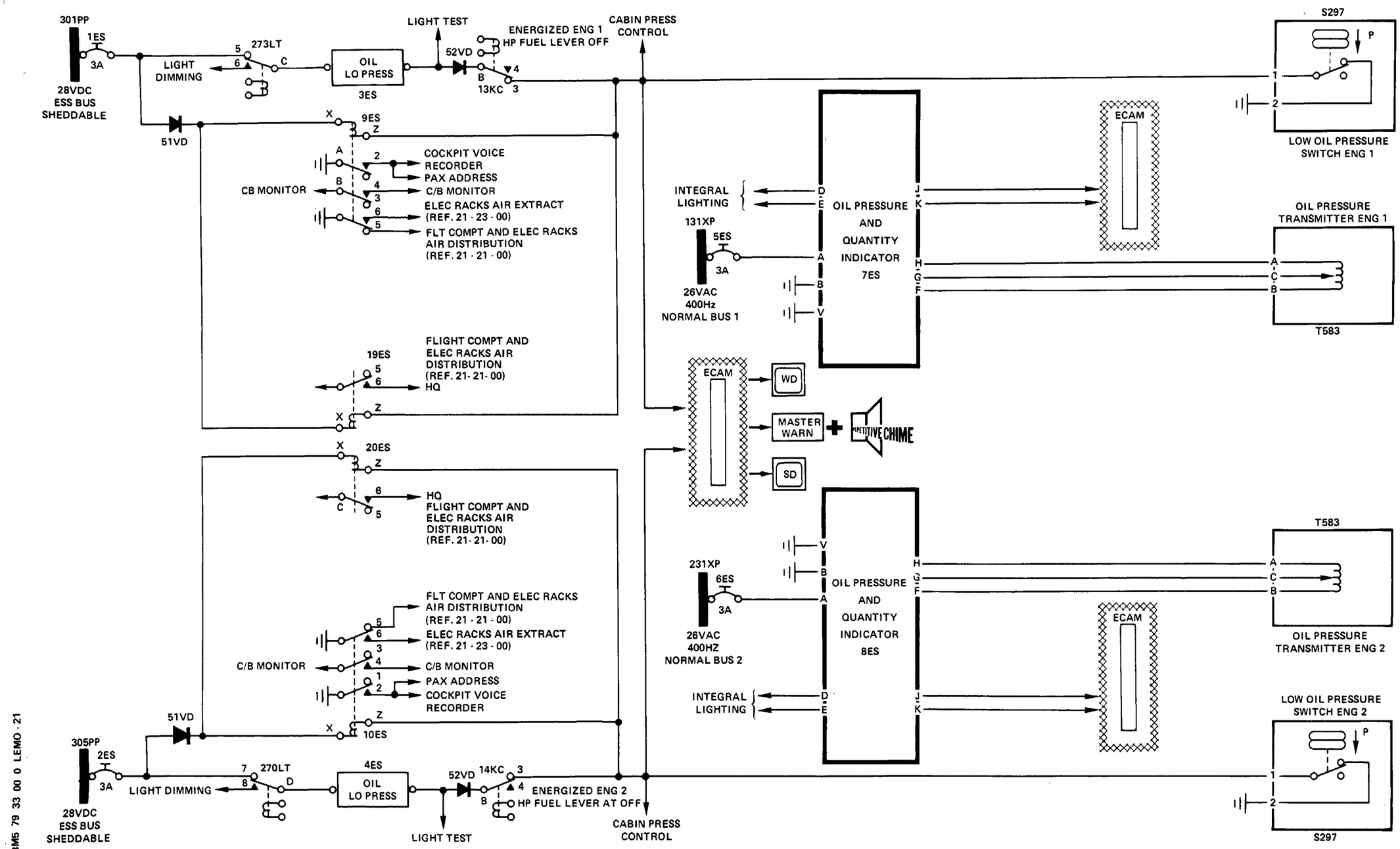
Oil Pressure Transmitter and Low Oil - Pressure Switch
Figure 001



Oil Pressure Indicating and Warning Electrical Circuit
Figure 002

0.655 bar (9.5 psi).
- dispatch allowance of the indications of the circuit breaker monitoring system (WY circuit) when the oil pressure of both engines is lower than 0.655 bar (9.5 psi).

B. When oil pressure reaches 1.034 bar (15 psi) increasing, the pressure switch opens, which, if the HP fuel shut off valve is open, has for effect :
- to estinguish OIL LO PRESS warning light on the main instrument panel together with ENG warning light on the MASTER WARNING.
- to cut off supply to the ECAM display unit
- to commute the electronics rack cooling fan from high Speed to low Speed (HQ circuit).

In addition to the above mentioned actions, it has for effect on ground :
- to close the cabin outflow valves (HM circuit), when the oil pressure of both engines becomes higher than 1.034 bar (15 psi) (starting of the pre-pressurization sequence when one throttle control lever is moved beyond 22°).
- to set automatically into operation the cockpit voice recorder (RK circuit) when the oil pressure of one engine reaches 1.034 bar (15 psi).
- to increase the public address amplifier (RY circuit) power when the oil pressure of one engine reaches 1.034 bar (15psi).
- to inhibit the indications of the circuit breaker monitoring system (WY circuit) when the oil pressure of one engine reaches 1.034 bar (15 psi).

OIL PRESSURE AND LOP WARNING - ADJUSTMENT/TEST

1. Functional Test

A. Indicating System Test

(1)Reason for the job

This procedure provides instructions for oil pressure and low pressure indicating system test.

(2)Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 71-00-00, P. Block 501	Power Plant
- 24-41-00, P. Block 301	AC External Power Control

(3)Procedure

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED

(a)Job set-up

1 Initial conditions

. correct electrical power supply
. circuit breakers closed, particularly those associated with ENGINES, ECAM
. forward services ventilation system in operation

2 On center pedestal, on ECAM control panel

- using RIGHT DISPLAY control knob, adjust brightness on R ECAM display unit
- select ENGINE page by pressing ENG pushbutton switch (ENG push-button switch comes on).

3 Open, safety and tag the following circuit breakers

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG 1/FUEL HP VALVE CTL	3KC	333/T69
133VU	ENG 2/FUEL HP VALVE CTL	4KC	333/T70
21VU	SDAC/POWER SUPPLY	6WV	109/A5
133VU	ELEC AC BUS1 WARN RELAY	9XN	335/R78
133VU	ELEC AC BUS2 WARN RELAY	8XN	335/R83

4 Make certain that HP fuel shut off valve control lever is in OFF position

5 Make certain that on panel 4VU OIL LO PRESS warning light is on.

6 Wait at least 70 seconds.

(b)Test

ACTION	RESULT
1 On ECAM section of panel 47OVU	On CAPT and F/O main instrument panels 3VU and 5VU

ACTION	RESULT
	- MASTER WARN lights flash - continuous repetitive chime is activated - On L ECAM display unit the following message appears : ENG 1(2) ENG 1(2) OIL LO PR IF OIL PR BELOW 10 PSI THR1 (2)..... IDLE FUEL LEVER 1(2)..... OFF - Disregard the other warnings
- close the circuit breakers 6WV, 9XN and 8XN	On CAPT and F/O main instrument panels 3VU and 5VU - MASTER WARN lights go off and continuous repetitive chime is deactivated - Warning page on L ECAM display unit disappears.
2 Dry motor engine (Ref. 71-00-00, P. Block 501)	On panel 4VU Oil pressure indication increases on R ECAM display unit - oil pressure indication increases On panel 4VU - OIL LO PRESS warning light goes off when oil pressure reaches 15 psi (1.034 bar)
3 Shut down engine	

(c)Close-up
1 Remove safety clips and tags and close circuit breakers 3KC and 4KC.
2 De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

B. Accuracy Test
(1)Reason for the job
To test accuracy of oil pressure transmitter and low oil pressure switch
(2)Equipment and Materials

ITEM	DESIGNATION
(a)	HP Ground Air Supply
(b)	Container Suitable for Oil
(c)	Oils

Referenced Procedures

ITEM	DESIGNATION
- 71-13-00, P. Block 301	Cowl Doors
- 71-00-00, P. Block 501	Power Plant
- 24-41-00, P. Block 301	AC External Power Control
- 12-13-79, P. Block 1	Engine Lubricating Oil
- 79-34-11, P. Block 401	Low Oil Pressure Switch
- 79-33-11, P. Block 401	Oil Pressure Transmitter

(3)Procedure
(a)Job set-up
1 Initial conditions
. correct electrical power supply
. circuit breakers closed, particularly those associated with **ENGINE, ECAM**
. forward services ventilation system in operation.
2 On center pedestal, on **ECAM** control panel
- using **RIGHT DISPLAY** knob, adjust brightness on **R ECAM** display unit
- select **ENGINE** page by pressing **ENG** pushbutton switch (**ENG** pushbutton switch comes on).
3 Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG 1/FUEL HP VALVE CTL	3KC	333/T69
133VU	ENG 2/FUEL HP VALVE CTL	4KC	333/T70
21VU	SDAC/POWER SUPPLY	6WV	109/A 5
133VU	ELEC AC BUS 1 WARN RELAY	9XN	335/R78
133VU	ELEC AC BUS 2 WARN RELAY	8XN	335/R83

4 Make certain that the HP fuel shut off valve control lever is in OFF position.
5 Open safety and tag circuit breaker for appropriate engine and open thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
6 Position a container under the low oil pressure switch
R 7 Disconnect tubing couplers from inlet (high pressure) and outlet
R (low pressure) ports of low oil pressure switch (79-34-11, P. Block 401).
R 8 Connect compressed air source to inlet (high pressure) port of low oil pressure switch.
(b)Alarm test

ACTION	RESULT
1 Without pressure	On panel 4VU - **OIL LO PRESS** warning light comes on
2 On **ECAM** section of panel 47OVU	On **CAPT** and **F/O** main instrument panels 3VU and 5VU

ACTION	RESULT
	- MASTER WARN lights flash - continuous repetitive chime is activated - On L ECAM display unit the following message appears : ENG 1(2) ENG 1(2) OIL LO PR IF OIL PR BELOW 10 PSI THR1(2)..... IDLE FUEL LEVER 1(2)..... OFF
3 Slowly supply compressed air, increase the pressure to 15 psi maximum	On panel 4VU - OIL LO PRESS warning light goes off On CAPT and F/O main instrument panels 3VU and 5VU - MASTER WARN lights go off and - continuous repetitive chime is deactivated - Warning page on L ECAM display unit disappears.
4 Slowly reduce air pressure to a value ≤11 ± 1 psi (0.758 ± 0.069 bar)	On panel 4VU - OIL LO PRESS warning light comes on On CAPT and F/O main instrument panels 3VU and 5VU - MASTER WARN lights flash - continuous repetitive chime is activated - On L ECAM display unit the following message appears : ENG 1(2) ENG 1(2) OIL LO PR IF OIL PR BELOW 10 PSI THR1(2)..... IDLE FUEL LEVER 1(2)..... OFF
5 Close the circuit breakers 6WV, 9XN and 8XN	On CAPT and F/O main instrument panels 3VU and 5VU - MASTER WARN lights go off and continuous repetitive chime is deactivated - Warning page on L ECAM display unit disappears.

(c)Indicating test

ACTION	RESULT
1 Disconnect compressed air source and connect tubing couplers at inlet (high pressure) and outlet (low pressure) ports of pressure switch (Ref. 79-34-11, P. Block 401)	
2 Disconnect tube couplings at inlet (high pressure) and outlet (low pressure) ports of pressure transmitter, then connect compressed air source at the inlet (high pressure) port transmitter (Ref. 79-33-11, P. Block 401)	On panel 4VU - OIL LO PRESS warning light stays on, disregard the warning. - Oil pressure indicator is at zero On R ECAM display unit - oil pressure indication is zero
3 Slowly supply compressed air at a pressure of ≥ 15 psi (1.034 bar) and stabilize NOTE : You may have a very transient warning between 14 and 15 psi (0.965 and 1.034 bar).	On panel 4VU - Oil pressure indication increases On CAPT and F/O main instrument panels 3VU and 5VU - On L ECAM display unit the following message appears : ENG 1(2) ENG 1(2) OIL LO PR IF OIL PR BELOW 10 PSI THR1(2)..... IDLE FUEL LEVER 1(2)..... OFF On panel 8VU - Oil pressure indication on the ENGINE page of the ECAM display unit increases and reading is identical to oil pressure indicator in 4VU.

(d)Close-up

1 Disconnect compressed air source

2 Connect tubing couplers to inlet (high pressure) and outlet (low pressure) ports of the pressure transmitter (79-33-11, P. Block 401).

3 Close circuit breakers open for the test

4 Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

5 Check oil level (Ref. 12-13-79, P. Block 1).

6 Dry motor engine (Ref. 71-00-00, P. Block 501) and check for leakage.

7 After engine coast down check again oil level.

8 Close thrust reverser cowl doors (Ref. 71-13-00, P. Block 301)

9 De-energize the aircraft electrical network (Ref. 24-41-00,

P. Block 301).

10 Restore system and aircraft to normal operating condition.

OIL PRESSURE TRANSMITTER - REMOVAL/INSTALLATION

1. General

A. This procedure provides instructions for removal and installation of the oil pressure transmitter.

B. Access to the oil pressure transmitter is through the left reverser cowl door.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Torque Wrench, 50 - 150 lbf.in. (0.5 and 1.69 m.daN)
C. Material No.C02-023	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
Referenced Procedures	
- 12-13-79, P. Block 1	Engine Lubricating Oil
- 71-13-00, P. Block 301	Cowl Doors
- 71-00-00, P. Block 501	Power Plant

3. Procedure

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG1/OIL PRESS	5ES	336/Q70
133VU	ENG2/OIL PRESS	6ES	336/Q71

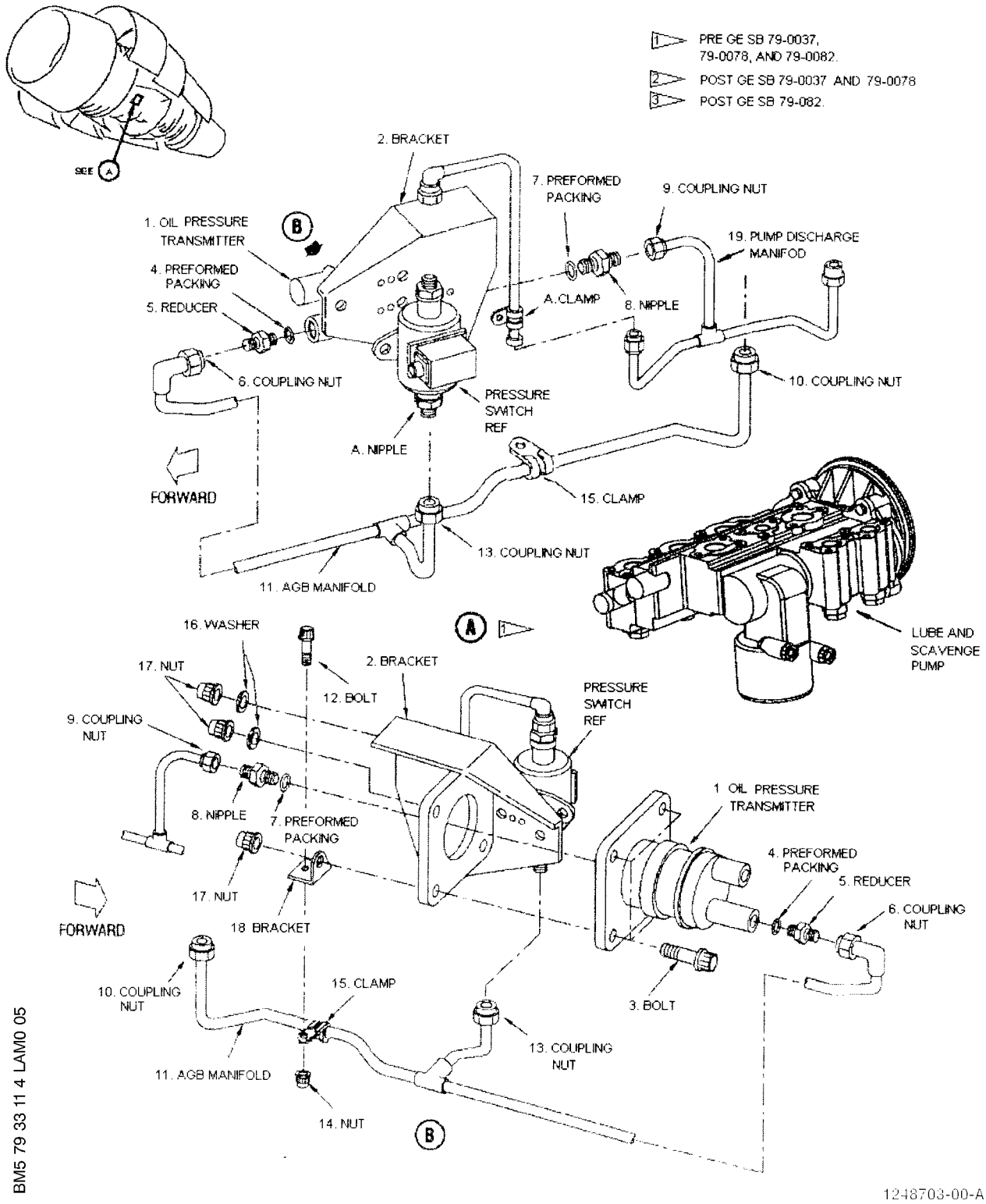
(2)Open, safety and tag the applicable circuit breakers and open the left fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

R PRE SB GE 79-037 (OIL PRESSURE TRANSMITTER TUBE CHANGES).
R PRE SB GE 79-078
R PRE SB GE 79-082

R B. Removal (Ref. Fig. 401)
R (1)Remove the oil pressure transmitter (1) as follows :
R (a)Disconnect the electrical connector from the transmitter (1) and
R install protective covers.
R NOTE : The oil pressure switch electrical connector and harness can
R be disconnected and moved to get better access to the oil
R tubes.
R (b)Put a container below the pressure transmitter to drain the oil.
R (c)Disconnect the coupling nuts (10), (6) and (13) on the AGB
R manifold (11).

R (d)Remove bolt (12), nut (14), and clamp (15) that attach the AGB manifold (11) and remove the AGB manifold. Discard the used clamp (15).
R (e)Disconnect the coupling nut (9) on the pump discharge manifold (19) and move the nut aft.
R (f)Remove the four bolts (3), three washers (16), four nuts (17) and bracket (18). Remove the oil pressure transmitter (1) and drain the oil into a container.
R (g)If the oil pressure transmitter (1) is to be replaced, remove the reducer (5) and the nipple (8). Remove and discard the preformed packings (7) and (4).
R (h)Install protective covers on transmitter ports and tubes.

R C. Installation (Ref. Fig. 401)
R (1)Install the oil pressure transmitter (1) as follows :
R (a)Remove the protective covers from the oil pressure transmitter (1), the reducer (5), the nipple (8), and the coupling nuts (6), (9), (10) and (13).
R (b)If removed, lubricate the performed packings (4) and (7) with Material No.C02-023 and install on reducer (5) and the nipple (8). Install on the oil pressure transmitter (1). Install the reducer (5) and nipple (8) on the oil pressure transmitter.
R (c)TORQUE the reducer (5) and nipple (8) to between 135 to 150 lbf.in. (1.53 and 1.69 m.daN).
R (d)Install the oil pressure transmitter (1) with four bolts (3), bracket (18), three washers (16), and four nuts (17). Keep the bolts (3) loose 3 to 4 turns.
R NOTE : The three washers (16) are used, but where the bracket (18) is used, the bracket (18) replaces the washer.
R (e)Put the AGB manifold (11) in position, connect the coupling nuts (6) and (13) and tighten them by hand.
R (f)Connect the coupling nut (9) while you hold the oil pressure transmitter (1) tight against the transmitter bracket (2), tighten by hand.
R (g)Connect the coupling nut (10) and tighten by hand.
R (h)Install new clamp (15) on the AGB manifold (11) and attach it to the bracket (18) with the bolt (12) and the nut (14). Tighten the nut by hand.
R (i)TORQUE the four bolts (3) to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN).
R (j)TORQUE the nut (14) on the bolt (12) to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
R NOTE : Hold reducer (5) and nipples (8), (A) with a wrench while torquing coupling nuts (6), (9) and (13).
R CAUTION : TORQUE ABOVE 300 LBF. IN APPLIED TO THE REDUCER (5) OR TO THE NIPPLES (8) AND (A) MAY DAMAGE THE TRANSMITTER PORTS.
R (k)TORQUE the coupling nuts (9) and (13) to between 135 and 150 lbf.in. (1.53 and 1.69 m.daN).
R (l)TORQUE the coupling nuts (6) and (10) to between 270 and 300 lbf.in. (3.05 to 3.39 m.daN).
R (m)Make sure the torques are correct in steps (k) through (l).



BM5 79 33 11 4 LAM0 05

Oil Pressure Transmitter (PRE SB GE 79-037 ; PRE SB GE 79-078 ; PRE SB GE 79-082)
Figure 401

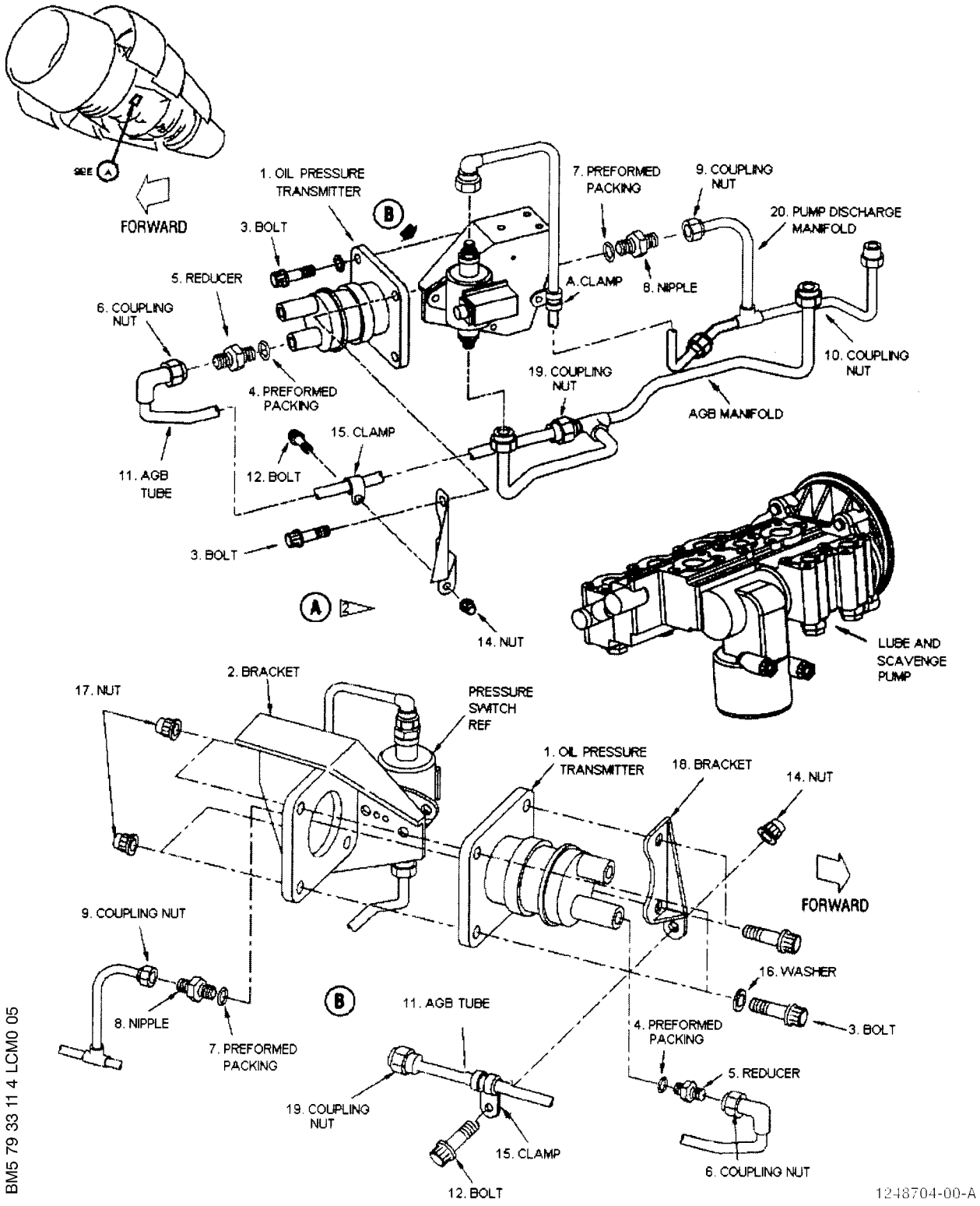
R

R CAUTION : REPLACE REMOVED CLAMPS WITH NEW CLAMPS. MAKE SURE ALL CLAMPS
R (15), AND (A) ARE INSTALLED CORRECTLY. IF LOOP CLAMPS ARE NOT
R INSTALLED CORRECTLY, DAMAGE TO THE OIL TUBES AND OIL LOSS CAN
R OCCUR.
R (n)Attach the couplings (6) and (10) with lockwire or safety cable if
R they are post SB 79-069.
R (o)Remove protective covers and connect electrical connector to
R transmitter (1). Tighten the connector finger tight plus one-eighth
R turn.
R (p)Connect pressure switch harness if it was disconnect and tight to
R finger tight plus one-eighth turn.
R (q)Do the oil servicing.
R END PRE SB GE 79-037
R END PRE SB GE 79-078
R END PRE SB GE 79-082

R POST SB GE 79-037 (OIL PRESSURE TRANSMITTER TUBE CHANGES).
R POST SB GE 79-078 (OIL AGB TUBE REPLACEMENT FOR IMPROVED TESTING)

R B. Removal (Ref. Fig. 402)
R (1)Remove the oil pressure transmitter (1) as follows :
R (a)Disconnect the electrical connector from the transmitter (1) and
R install protective covers.
R NOTE : The oil pressure switch electrical connector and harness can
R be disconnected and moved to get better access to the oil
R tubes.
R (b)Put a container below the pressure transmitter to drain the oil.
R (c)Disconnect the coupling nuts (6) and (19).
R (d)Remove bolt (12), nut (14), and clamp (15) that attach the AGB
R tube (11) and remove the AGB tube. Discard used clamp (15).
R (e)Disconnect the coupling nut (9) on the pump discharge manifold (20)
R and move the nut aft. Remove the four bolts (3), two washers (16),
R four nuts (17) and bracket (18). Remove the oil pressure transmitter
R (1) and drain the oil into a container.
R (f)If the oil pressure transmitter (1) is to be replaced, remove the
R reducer (5) and the nipple (8). Remove and discard the preformed
R packings (7) and (4).
R (h)Install protective covers on transmitter ports and tubes.

R C. Installation (Ref. Fig. 402)
R (1)Install the oil pressure transmitter (1) as follows :
R (a)Remove the protective covers from the oil pressure transmitter (1),
R the reducer (5), the nipple (8) and the coupling nuts (6), (9) and
R (19).
R (b)If removed, lubricate the preformed packings (4) and (7) with
R material No.C02-023 and install on reducer (5) and the nipple (8).
R Install the reducer (5) and nipple (8) on the oil pressure transmitter
R (1).
R (c)TORQUE the reducer (5) and nipple (8) to between 135 and 150 lbf.in.
R (1.53 and 1.69 m.daN).



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Oil Pressure Transmitter (POST SB GE 79-037 ; POST SB GE 79-078)
Figure 402

R

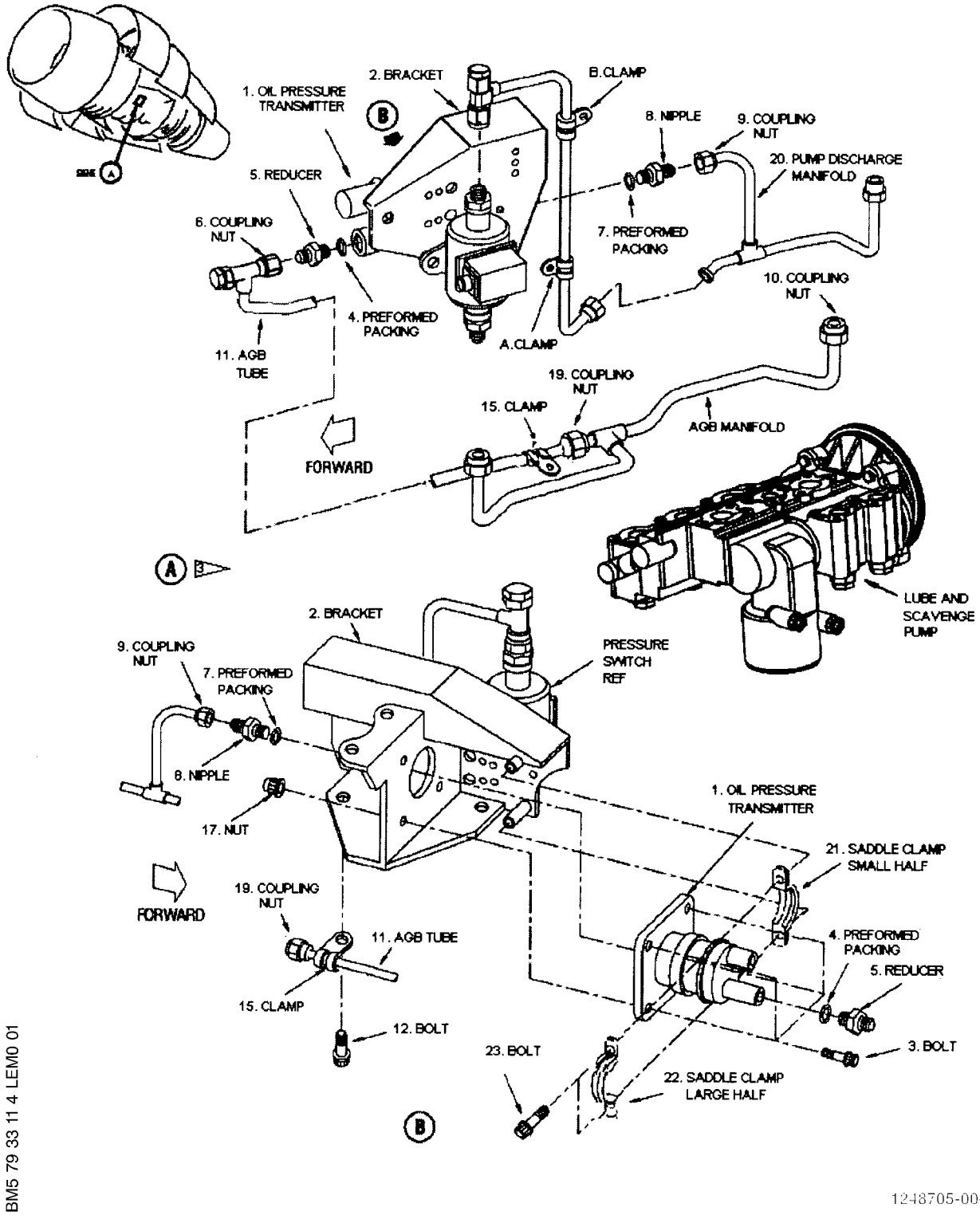
R (d)Install the oil pressure transmitter (1) with four bolts (3), bracket (18), two washers (16), and four nuts (17). Keep the bolts (3) loose 3 to 4 turns.
R NOTE : The two washers (16) are used, but where the bracket (18) is used, the bracket (18) replaces the washers.
R (e)Put the AGB tube (11) in position, connect the coupling nuts (6) and (19) and tighten them by hand.
R (f)Connect the coupling nut (9) while you hold the oil pressure transmitter (1) tight against the transmitter bracket (2) and tighten by hand.
R (g)Install new clamp (15) on the AGB tube (11) and attach it to the bracket (18) with the bolt (12) and the nut (14). Tighten the nut by hand.
R (h)TORQUE the four nuts (17) to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN).
R (i)TORQUE the nut (14) on the bolt (12) to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
R NOTE : Hold reducer (5) and nipple (8) with wrench while torquing coupling nuts (6) and (9).
R CAUTION : TORQUE ABOVE 300 LBF. IN APPLIED TO THE REDUCER (5) OR THE NIPPLE (8) MAY DAMAGE THE TRANSMITTER PORTS.
R (j)TORQUE the coupling nut (9) to between 135 and 150 lbf.in. (1.53 and 1.69 m.daN).
R (k)TORQUE the coupling nuts (6) and (19) to between 270 and 300 lbf.in. (3.05 and 3.39 m.daN).
R (l)Make sure the torques are correct in steps (j) through (k).
R (m)Attach the couplings (6) and (19) with lockwire or safety cable if they are post SB 79-069.
R CAUTION : REPLACE REMOVED CLAMPS WITH NEW CLAMPS. MAKE SURE ALL CLAMPS (15) AND (A) ARE INSTALLED CORRECTLY. IF LOOP CLAMPS ARE NOT INSTALLED CORRECTLY, DAMAGE TO THE OIL TUBES AND OIL LOSS CAN OCCUR.
R (n)Remove protective covers and connect electrical connector to transmitter (1). Tighten the connector finger tight plus one-eighth turn.
R (o)Connect pressure switch harness if it was disconnect and tight to finger tight plus one-eighth turn.
R (p)Do the oil servicing.
R END POST SB GE 79-037
R END POST SB GE 79-078

R POST SB GE 79-082 (OIL TUBE AND TRANSMITTER BRACKET-REPLACEMENT)

R B. Removal (Ref. Fig. 403)
R (1)Remove the oil pressure transmitter (1) as follows :
R (a)Disconnect the electrical connector from the transmitter (1) and install protective covers.
R NOTE : The oil pressure switch electrical connector and harness can be disconnected and moved to get better access to the oil tubes.
R (b)Put a container below the pressure transmitter to drain the oil.

R (c)Disconnect the coupling nuts (6) and (19) at the same time.
R (d)Remove bolt (12), the nut (14), and the clamp (15) that attach the AGB tube (11) and remove the AGB tube. Discard used clamp (15).
R (e)Disconnect the coupling nut (9) on the pump discharge manifold (20) and move the nut aft. Remove bolt (23), saddle clamps (22), and (21) from the transmitter (1). Remove bolts (3), nuts (17) that attach the transmitter (1) to the bracket. Remove the oil pressure transmitter (1) and drain the oil into a container.
R (f)If you replace the oil pressure transmitter (1), remove the reducer (5) and the nipple (8). Remove and discard the preformed packings (7) and (4).
R (g)Install protective covers on all transmitter ports and tubes.

R C. Installation (Ref. Fig. 403)
R (1)Install the oil pressure transmitter (1) as follows :
R (a)Remove the protective covers from the oil pressure transmitter (1), the reducer (5), the nipple (8) and the coupling nuts (6), (9) and (19).
R (b)If removed, lubricate the preformed packings (4) and (7) with material No.C02-023 and install on reducer (5) and the nipple (8). Install the reducer (5) and nipple (8) on the oil pressure transmitter (1).
R (c)TORQUE the reducer (5) and nipple (8) to between 135 and 150 lbf.in. (1.53 and 1.69 m.daN).
R (d)Place small half of saddle clamp (21) between transmitter (1) and bracket (2). This half can be temporarily held in place with bolts (23).
R (e)Attach the oil pressure transmitter (1) to bracket (2) with bolts (3) and self-locking nuts (17). Tighten the bolts with your hand.
R (f)Use the bolts (23) to install large half of saddle clamp (22) around oil pressure transmitter (1). Tighten the bolts with your hand.
R (g)Put the AGB tube (11) in position, connect the coupling nuts (6) and (19) and tighten them by hand.
R (h)Connect the coupling nut (9) while you hold the oil pressure transmitter (1) tight against the transmitter bracket (2), tighten by hand.
R (i)Install new clamp (15) on the AGB tube (11) and attach it to the bracket (2) with the bolt (12) and the nut (14). Tighten the nut by hand.
R (j)TORQUE two saddle clamp bolts (23) to between 33 and 37 lbf.in. (0.37 and .042 m.daN).
R (k)TORQUE the four nuts (17) to between 55 and 70 lbf.in. (0.62 and .79 m.daN).
R (l)TORQUE the bolt (12) to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
R NOTE : Hold reducer (5) and nipple (8) with wrench while torquing coupling nuts (6) and (9).
R CAUTION : TORQUE ABOVE 300 LBF. IN APPLIED TO THE REDUCER (5) OR TO THE NIPPLE (8) MAY DAMAGE THE TRANSMITTER PORTS.
R (m)TORQUE the coupling nut (9) to between 135 and 150 lbf.in. (1.53 and 1.69 m.daN).



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Oil Pressure Transmitter (POST SB GE 79-082)
Figure 403

R

R (n)TORQUE the coupling nuts (6) and (19) to between 270 and 300 lbf.in. (3.05 and 3.39 m.daN).
R (o)Make sure the torques are correct in steps (m) through (n).
R (p)Attach the couplings (6) and (19) with lockwire or safety cable if they are post SB 79-069.
R CAUTION : REPLACE REMOVED CLAMPS WITH NEW CLAMPS. MAKE SURE ALL CLAMPS (15), (A) AND (B) ARE INSTALLED CORRECTLY. IF LOOP CLAMPS ARE NOT INSTALLED CORRECTLY, DAMAGE TO THE OIL TUBES AND OIL LOSS CAN OCCUR.
R (q)Remove protective covers and connect electrical connector to transmitter (1). Tighten the connector finger tight plus one-eighth turn or 45 degrees.
R (r)Connect pressure switch harness if it was disconnect and tight to finger tight plus one-eighth turn.
R (s)Do the oil servicing.
R END POST SB GE 79-082

D. Test
(1)Do idle leak check (Ref. 71-00-00, P. Block 501).
(2)Check unions for leakage.

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close left fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

OIL PRESSURE AND QUANTITY DUAL INDICATOR - REMOVAL/INSTALLATION

NOTE : Removal/Installation procedures for OIL PRESS & QTY indicators on L and R engines are identical.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Blanking Caps/Plugs
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 71-00-00, P. Block 501	Power Plant - General

2. Procedure

A. Job Set-Up
(1)Open, safety and tag the following circuit breakers :

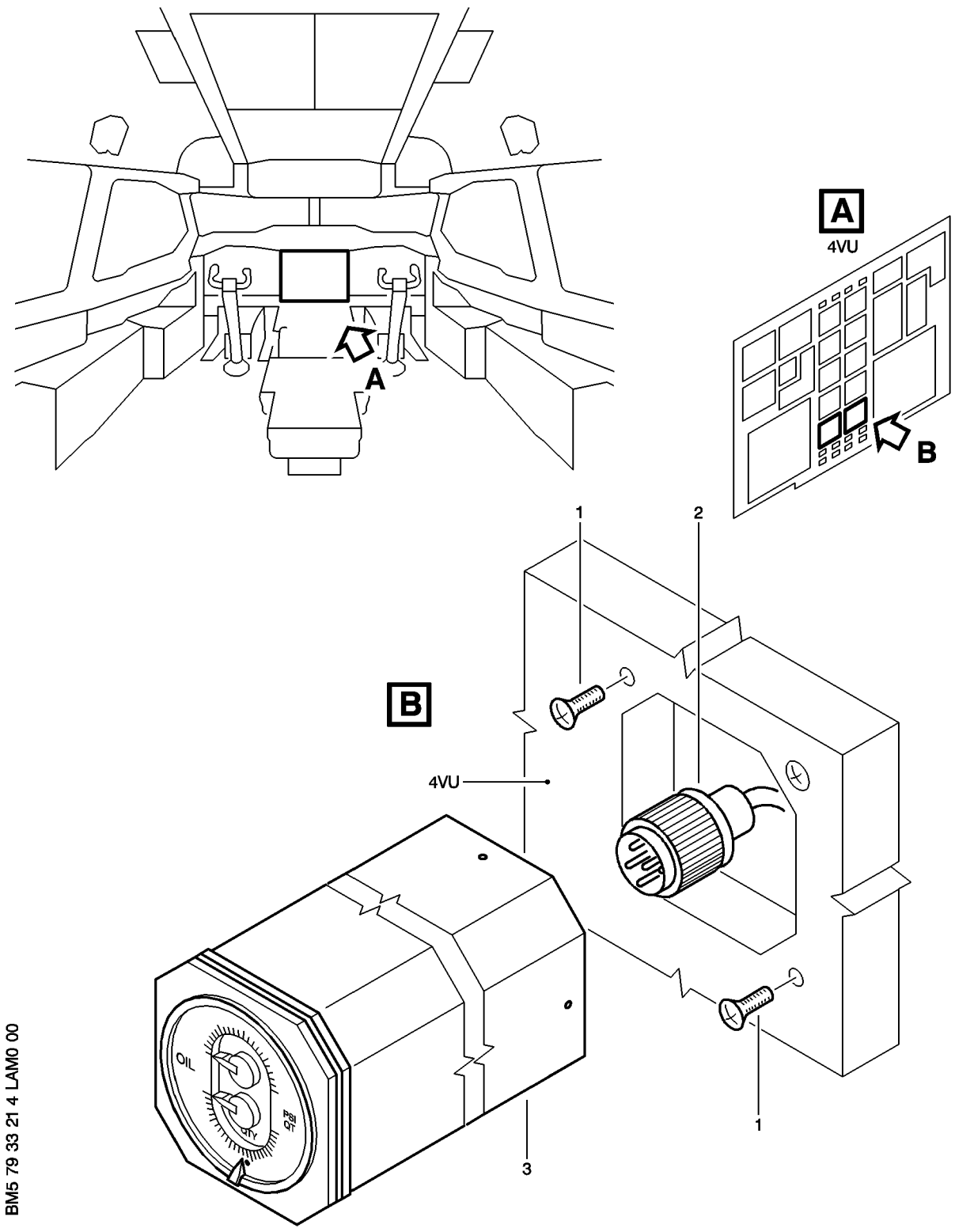
PANEL	SERVICE	IDENT.	LOCATION
133VU	ENGINES/OIL ENG 1 OIL QTY	1EN	336/Q68
133VU	ENGINES/OIL ENG 2 OIL QTY	2EN	336/Q73
133VU	ENGINES/OIL ENG 1 OIL PRESS	5ES	336/Q70
133VU	ENGINES/OIL ENG 2 OIL PRESS	6ES	336/Q71

B. Removal
(Ref. Fig. 401)
(1)On face of panel 4VU, remove two screws (1) attaching OIL PRESS & QTY indicator.
(2)Remove OIL PRESS & QTY indicator (3) from panel 4VU.
(3)Disconnect OIL PRESS & QTY indicator and blank off plug and receptacle (2).

C. Installation
(1)Check housing of OIL PRESS & QTY indicator on panel 4VU.
(2)Remove blanking caps from plug and receptacle (2) and connect plug.
(3)Install OIL PRESS & QTY indicator (3) in panel 4VU.
(4)Attach OIL PRESS & QTY indicator (3) to panel 4VU with two screws (1).
(5)Remove safety clips and tags and close circuit breakers 1EN, 2EN, 5ES and 6ES.

D. Test
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Check the oil quantity pointer indiquate a value.
(3)Perform an engine dry motoring (Ref. 71-00-00, P. Block 501) and check the oil pressure pointer is increasing.

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.



Oil Pressure and Quantity Indicator
Figure 401

(2)Restore aircraft systems to normal operating condition.

LOW OIL PRESSURE SWITCH - REMOVAL/INSTALLATION

1. General

A. This procedure provides instructions for removal and installation of the low oil pressure switch.

B. Access to the low oil pressure switch is through the left reverser cowl door.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B. Material No.C02-023	Anti Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
C.	Torque Wrench 24-150 lbf.in. (0.27 and 1.69 m.daN)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 71-00-00, P. Block 501	Power Plant - General

3. Procedure

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG1/LO PRESS	1ES	336/Q69
133VU	ENG2/LO PRESS	2ES	336/Q72

(2)Open, safety and tag the appropriate circuit breakers and open left fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

PRE SB GE 72-037* (ACCESSORY DRIVE MODULE - WITHOUT AGB HOUSING AND ACCESSORY CHANGES)**

Pre SB GE 72-037

B. Removal (Ref. Fig. 401)

(1)Remove low oil pressure switch as follows :

(a)Disconnect electrical connector from low oil pressure switch and install protective covers.

(b)Place a suitable container under switch and disconnect tubes from tee fittings, allowing oil in tubes to drain.

R (c)If necessary, remove the loop clamps from the pump discharge
R pressure tube.

R (d)Remove bolts attaching switch to bracket and remove switch from engine.

R (e)Remove tube couplings, reducers, and packings from switch and

discard packings. Install protective covers on switch and tubes.

C. Installation (Ref. Fig. 401)

CAUTION : THE LOW OIL PRESSURE SWITCH RESEMBLES THE OIL FILTER DIFFERENTIAL PRESSURE SWITCH. INSTALLATION OF THE INCORRECT SWITCH COULD CAUSE ENGINE DAMAGE.

(1)Install low oil pressure switch as follows :

(a)Remove protective covers from switch.

(b)Install switch on bracket with bolts. TORQUE bolts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

R (c)Install packings on reducers and reducers in switch. TORQUE
R reducers to between 135 and 150 lbf.in. (1.53 and 1.69 m.daN).

(d)Attach coupling on brazed U-tube which is connected to the pressure transmitter vent tube to the pressure switch union. TORQUE coupling to between 135 and 150 lbf.in. (1.53 and 1.69 m.daN).

(e)Attach coupling on brazed U-tube which is connected to the pressure transmitter pressure tube to switch pressure side union. TORQUE coupling to between 135 and 150 lbf.in. (1.53 and 1.69 m.daN).

R CAUTION : MAKE SURE ALL LOOP CLAMPS ARE INSTALLED CORRECTLY. IF LOOP
R CLAMPS ARE NOT CORRECTLY INSTALLED, DAMAGE TO THE OIL TUBES
R AND OIL LOSS CAN OCCUR.

R (f)If removed, install loop clamps to the pump discharge pressure tube.
R TORQUE the loop clamps to between 33 and 37 lbf.in. (0.37 and
R 0.42 m.daN).

R (g)Remove protective covers and connect electrical connector to switch. Tighten connector fingertight plus one-eighth turn.

End Pre SB GE 72-037
Pre SB GE 79-078 and Pre SB GE 79-082
Post SB GE 72-037*** (ACCESSORY DRIVE MODULE-AGB HOUSING AND ACCESSORY CHANGES).

B. Removal (Ref. Fig. 402)

(1)Remove low oil pressure switch as follows :

(a)Disconnect electrical connector from the low oil pressure switch and install a protective cover.

(b)Place a suitable container under switch and disconnect the coupling
R nuts on the reducers on the pressure switch.

R (c)If necessary, remove the loop clamps from the pump discharge
R pressure tube.

R (d)Remove the bolts securing the pressure switch to the bracket and remove the switch from the engine.

R (e)Remove the reducers and packings from the pressure switch. Discard packings. Install protective caps on switch and tubes.

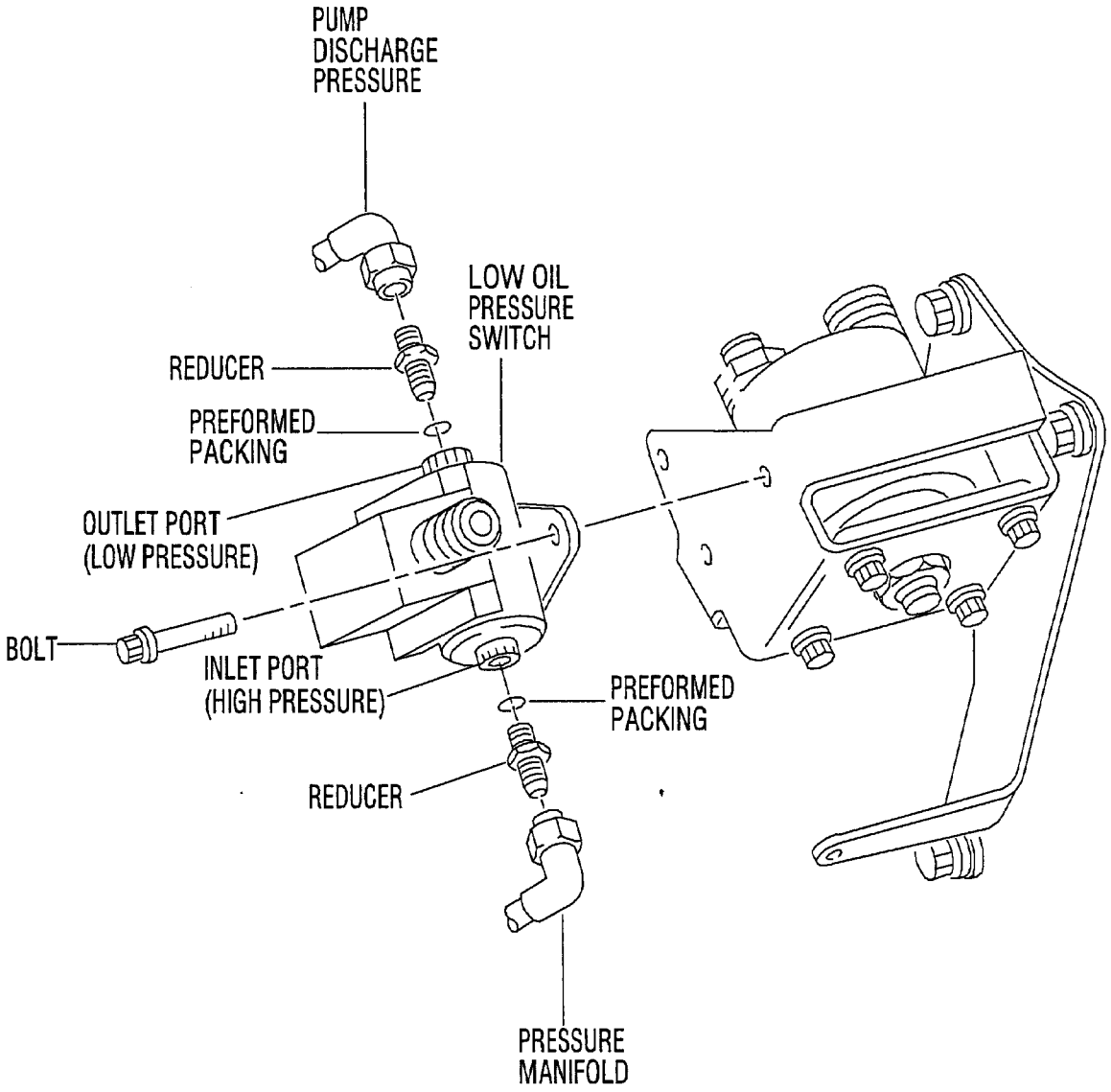
C. Installation (Ref. Fig. 402)

CAUTION : THE LOW OIL PRESSURE SWITCH RESEMBLES THE OIL FILTER DIFFERENTIAL PRESSURE SWITCH.
INSTALLATION OF THE INCORRECT SWITCH COULD CAUSE ENGINE DAMAGE.

(1)Install low oil pressure switch as follows :

(a)Remove protective covers from switch and tubing.

(b)Install switch on bracket with bolts. TORQUE bolts to between 33 and



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Low Oil Pressure Switch (Pre SB GE 72-037)
Figure 401

R

37 lbf.in. (0.37 and 0.42 m.daN).

R (c)Install preformed packings on reducers and install reducers
R on switch. TORQUE reducers to between 135 and 150 lbf.in.
(1.53 and 1.69 m.daN).

R (d)Install coupling nut from pump discharge pressure tube to reducer
on the pressure switch. TORQUE coupling nut to between 135 and 150
lbf.in. (1.53 and 1.69 m.daN).

R (e)Install coupling nut from pressure manifold to reducer on the
pressure switch. TORQUE coupling nut to between 135 and 150 lbf.in.
(1.53 and 1.69 m.daN).

(f)Connect electrical connector to pressure switch. Tighten connector
fingertight plus one-eighth turn.

R CAUTION : MAKE SURE ALL LOOP CLAMPS ARE INSTALLED CORRECTLY. IF LOOP
R CLAMPS ARE NOT CORRECTLY INSTALLED, DAMAGE TO THE OIL TUBES
R AND OIL LOSS CAN OCCUR.

R (g)If removed, install loop clamps to the pump discharge pressure tube.
R TORQUE the loop clamps to between 33 and 37 lbf.in. (0.37 and
R 0.42 m.daN).

End Post SB GE 72-037
End Pre SB GE 79-078 and End Pre SB GE 79-082

Post SB GE 79-078 (AGB OIL TUBE REPLACEMENT FOR IMPROVED TESTING)
Post SB GE 79-082 (OIL TUBE AND TRANSMITTER BRACKET REPLACEMENT)

B. Removal (Ref. Fig. 403)

(1)Remove the low oil pressure switch as follows :

(a)Disconnect the electrical connector from the low oil pressure switch
and install a protective cover.

(b)Place a sufficient container under the pressure switch and disconnect
R the coupling nuts on the reducers on the pressure switch.

R (c)If necessary, remove the loop clamps from the pump discharge
R pressure tube.

R (d)If the flared plug is installed, remove the flared plug from the lube
oil tube.

R (e)Remove the three bolts and one nut that attach the pressure switch to
the bracket and remove the switch from the engine.

R (f)Remove the reducers and packings from the pressure switch. Discard
the packings. Install the protective caps on the switch and the tubes.

C. Installation (Ref. Fig. 403)

CAUTION : THE LOW OIL PRESSURE SWITCH LOOKS ALMOST THE SAME AS THE OIL
FILTER DIFFERENTIAL PRESSURE SWITCH. INSTALLATION OF THE
INCORRECT SWITCH COULD CAUSE ENGINE DAMAGE.

(1)Install the low oil pressure switch as follows :

(a)Remove the protective covers from the switch and the tubing.

(b)Install the switch on the bracket with three bolts and one nut.
TORQUE the bolts and the nut to between 33 and 37 lbf.in.
(0.37 and 0.42 m.daN).

R (c)Install the preformed packings on the reducers and install the
R reducers on the switch. TORQUE the reducers to between 135
and 150 lbf.in. (1.53 and 1.69 m.daN).

R (d)Install the coupling nut from the lube oil tube to the reducer on the pressure switch. TORQUE the coupling nut to between 135 and 150 lbf.in. (1.53 and 1.69 m.daN).

(e)If the flared plug is not installed, intall the flared plug in the lube oil fitting. TORQUE the flared plug to between 135 and 150 lbf.in. (1.53 and 1.69 m.daN). Install lockwire or safety cable on the flared plug.

R (f)Install the coupling nut from the pressure manifold to the reducers on the pressure switch. TORQUE the coupling nut to between 135 and 150 lbf.in. (1.53 and 1.69 m.daN).

R CAUTION : MAKE SURE ALL LOOP CLAMPS ARE INSTALLED CORRECTLY. IF LOOP
R CLAMPS ARE NOT CORRECTLY INSTALLED, DAMAGE TO THE OIL TUBES
R AND OIL LOSS CAN OCCUR.

R (g)If removed, install loop clamps to the pump discharge pressure tube. TORQUE the loop clamps to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

R (h)Connect the electrical connector to the pressure switch. Tighten the connector finger tight plus one-eighth turn.

End Post SB GE 79-078 and End Post SB GE 79-082

D. Test

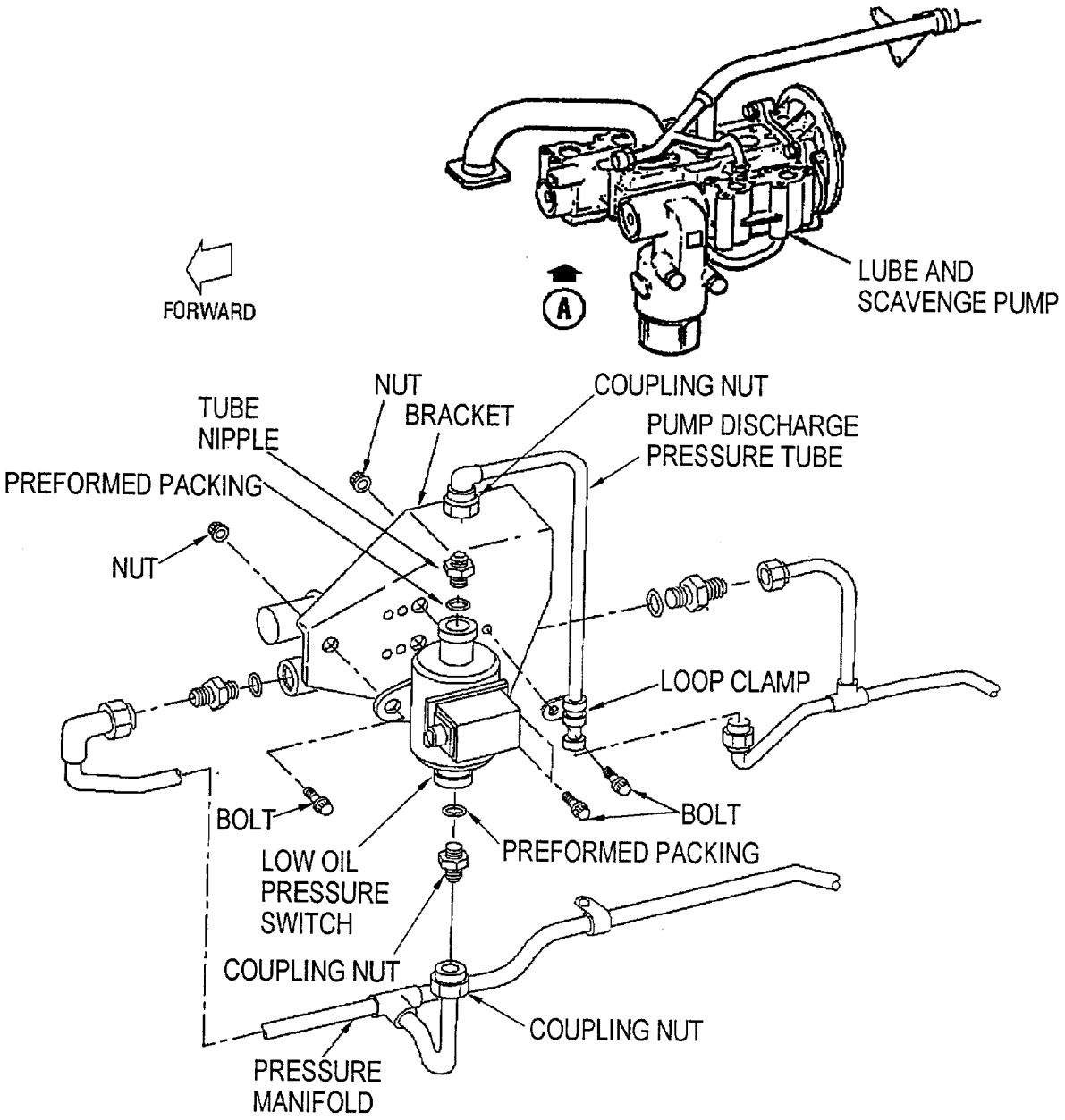
(1)Remove safety clips and tags and close circuit breakers (Ref. 71-13-00, P. Block 301) together with circuit breakers 1ES and 2ES.

(2)Do idle leak check (Ref. 71-00-00, P. Block 501).

E. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2)Close left thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).



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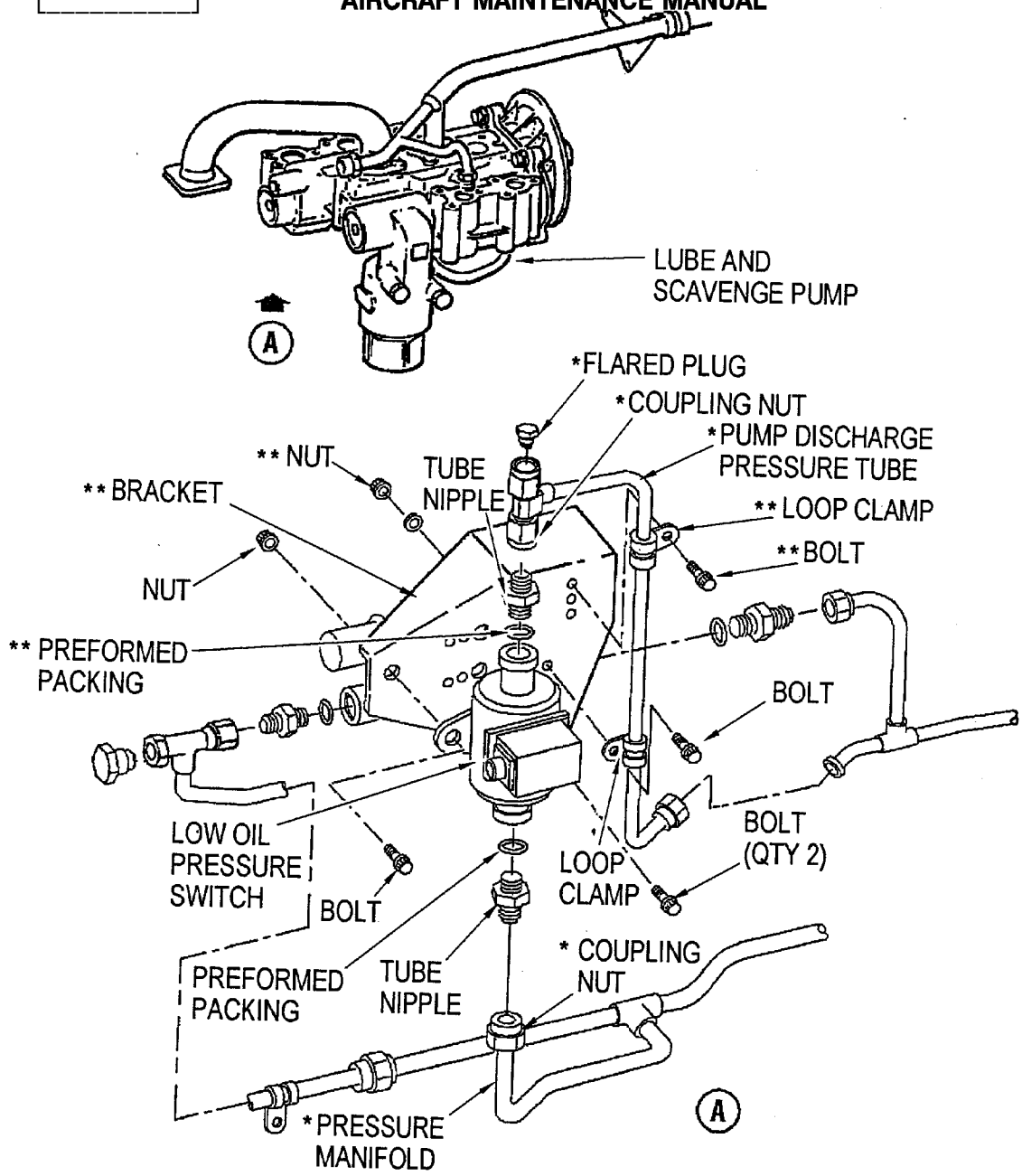
Low Oil Pressure Switch
(Post SB GE 72-037/Pre SB GE 79-078/Pre SB GE 79-082)
Figure 402

R



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Low Oil Pressure Switch
(Post SB GE 79-078/Post SB GE 79-082)
Figure 403

R

OIL FILTER CLOGGING - DESCRIPTION AND OPERATION

1. General (Ref. Fig. 001, 002)

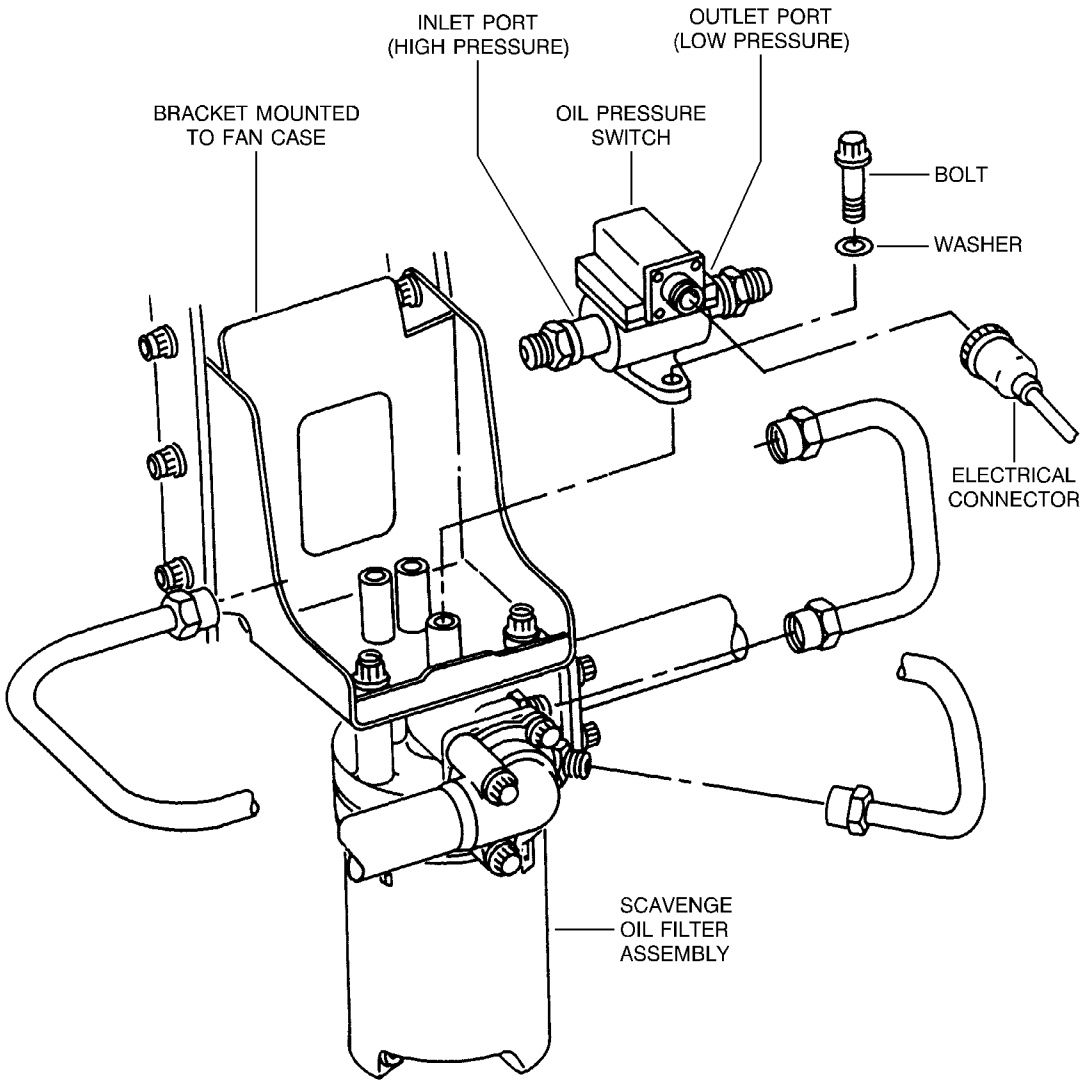
The pressure which is measured upstream and downstream of the scavenge filter gives the pressure differential in the filter.

When the pressure differential in the filter is higher than 2.276 bars (33 psid) increasing, the pressure switch closes which has for effect :

- to illuminate amber **OIL CLOG CAUTION** light 3EF (4EF) on main instrument panel (4VU).
- to illuminate amber **MASTER CAUTION** light and trigger the single chime.
- to activate L **ECAM** display unit which will give instructions to the crew members and display the **ENGINE** page on **R ECAM** display unit.

When the pressure differential in the filter drops below 1.517 bar minimum (22 psid) decreasing, the pressure switch opens, thus extinguishing the **CAUTION** lights.

OIL CLOG CAUTION light 3EF (4EF) is supplied with 28 volts from normal busbar 104PP (106PP) via circuit breaker 1EF (2EF).



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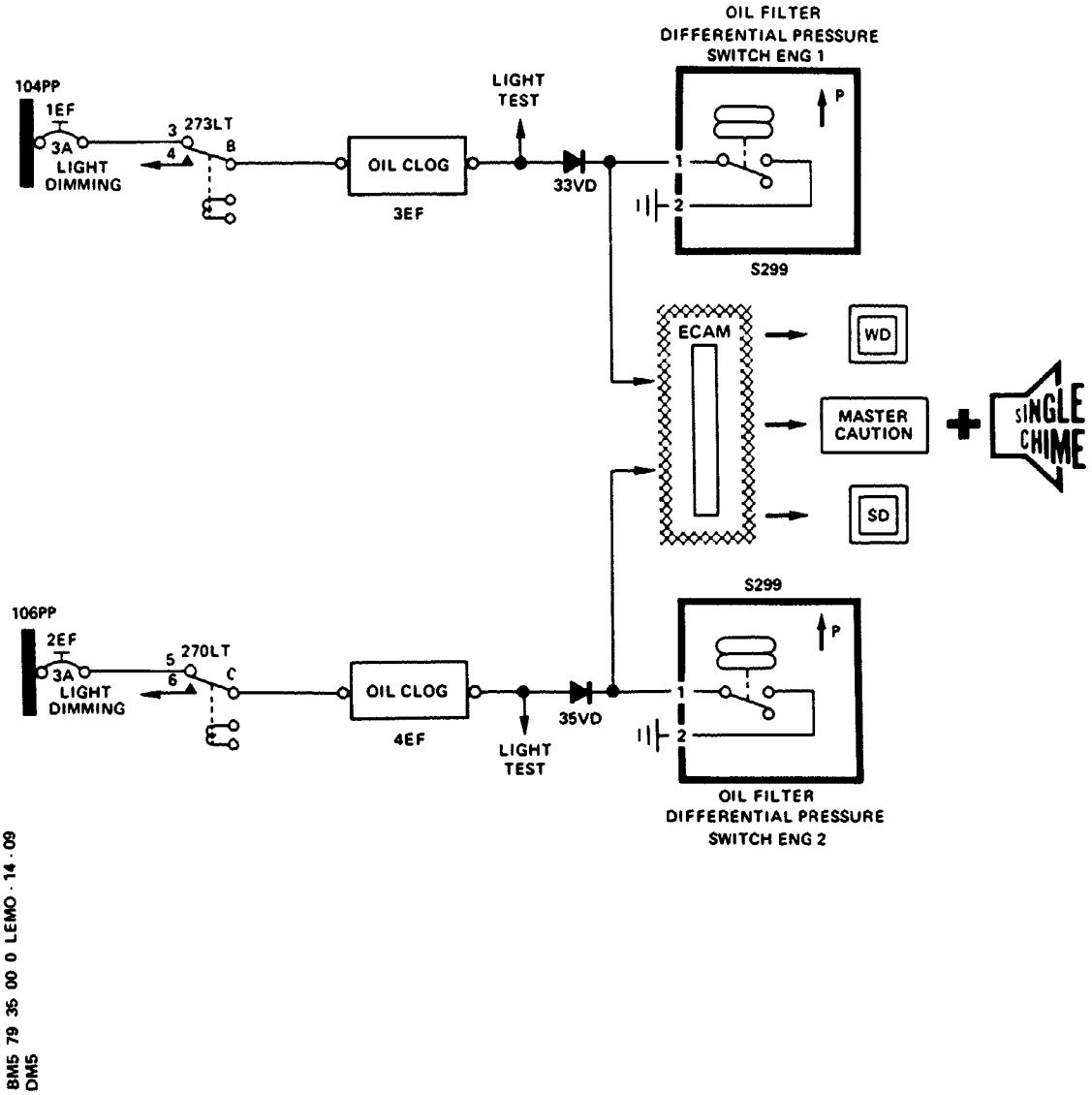
Oil Filter Differential Pressure Switch
Figure 001

R



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Oil Filter Clogging - Electrical Circuit
Figure 002

OIL FILTER CLOGGING INDICATING - ADJUSTMENT/TEST

1. Functional Test

A. Reason for the Job
This procedure provides instructions for functional test of engine oil filter differential pressure switch.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Container Suitable for Oil
(2)	HP Pressure Source
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 71-00-00, P. Block 501	Power Plant- General
- 12-13-79, P. Block 1	Engine Lubricating Oil
- 79-35-11, P. Block 401	Oil Filter Clogging Switch
- 24-41-00, P. Block 301	AC External Power Control

C. Procedure
WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

(1)Job set-up
(a)Initial conditions
- correct electrical power supply
- circuit breakers closed particularly those associated with ECAM, ENGINES
- forward services ventilation system in operation

(b)On center pedestal, on ECAM control panel
- using LEFT DISPLAY rheostat, adjust brightness on left ECAM display unit.
- press MASTER CAUTION light until MASTER CAUTION light goes off on CAPT and F/O main instrument panels 3VU and 5VU.

(c)Open, safety and tag circuit breakers for the appropriate engine and open fan cowl doors (Ref. 71-13-00, P. Block 301).

(d)Position a container under the differential pressure switch and disconnect tubing couplers at outlet (low pressure) and inlet (high pressure) ports of switch (Ref. 79-35-11, P. Block 401).

(e)Connect compressed air source to differential pressure switch inlet (high pressure) port.

(2)Test

ACTION	RESULT
(a)Supply compressed air at a pressure ≥ 33 psi (2.275 bar) stabilize	On panel 4VU - OIL CLOG warning light comes on
R (b)On the ECAM section of panel 47OVU, R press INHIBIT OVRD pushbutton switch	If the HP valves are in OFF position:

ACTION	RESULT
	- On panel 8VU **MASTER CAUTION** light on **CAPT** and **F/O** main instrument panels **3VU** and **5VU** comes on accompanied by a single chime - On L **ECAM** display unit **ENG 1(2)** appears: . **ENG 1(2) OIL FILTER CLOG** If the **HP** valves are in **ON** position: - On panel 8VU **MASTER CAUTION/MASTER WARNING** lights on **CAPT** and **F/O** main instrument panels **3VU** and **5VU** comes on accompanied by a continuous repetitive chime - On L **ECAM** display unit **ENG 1(2)** appears: . **ENG 1(2) OIL FILTER CLOG** . **THROTTLE 1(2) ... BELOW WARN** . **IF WARN AT IDLE AFTER 3 MN:** . **FUEL LEVER 1(2) ... OFF**
(c)Slowly reduce air pressure to ≤ 22 psi (1.516 bar)	Check that - On panel 4VU . **OIL CLOG** warning light goes off - On panel 8VU . **MASTER CAUTION** light on **CAPT** and **F/O** main instrument panels **3VU** and **5VU** goes off . Warning page on L **ECAM** display unit disappears

(3)Close-up
(a)Disconnect compressed air source
(b)Connect tube couplings at inlet (high pressure) and outlet (low pressure) ports of oil differential switch (Ref. 79-35-11, Block 401).
(c)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(d)Close the circuit breakers previously opened. Check oil level (Ref. 12-13-79, P. Block 1).
(e)Dry motor engine (Ref. 71-00-00, P. Block 501) and check for leakage.
(f)After coastdown check oil level.
(g)Close fan cowl doors (Ref. 71-13-00, P. Block 301).
(h)Remove safety clips and tags and close circuit breakers 1KG, 1JH, 2JH, 1KM and 2KM.
(i)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(j)Restore system and aircraft to normal operating condition.

OIL FILTER CLOGGING INDICATING - DEACTIVATION/REACTIVATION

Ref. : MMEL Sect. 1-79, Item 4 ("OIL CLOG" lt.)

1. Reason for the Job

A. Failure of Oil Filter Clogging Indicating System

2. Equipment and Materials

ITEM	DESIGNATION
A.	Warning Notice
B.	Circuit Breakers Safety Clips
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 71-00-00, P. Block 501	Power Plant - General
- 12-13-79, P. Block 1	Engine Lubricating Oil
- 79-22-01, P. Block 401	Scavenge Oil Filter
R - 79-22-01, P. Block 601	Scavenge Oil Filter

3. Procedure

A. Job Set-Up

R (1)Open, safety and tag the appropriate circuit breakers and open the
R right fan and thrust reverser cowl door (Ref. 71-13-00, P. Block 301).
(2)Remove the scavenge oil filter element (Ref. 79-22-01, P. Block 401, Para. 3.D.).

B. Deactivation

R (1)Check the scavenge oil filter (Ref. 79-22-01, P. Block 601).
R (2)Replace the scavenge oil filter (Ref. 79-22-01, P. Block 401) if
R recommended by the check (Ref. 79-22-01, P. Block 601).
R (3)Install a warning notice in the flight compartment indicating that
R shows that the OIL CLOG warning light system does not operate.

C. Close-Up

(1)Make sure that the work area is clean and clear of tools and miscellaneous items of equipment.
(2)Check oil level in oil tank. Add oil if necessary (Ref. 12-13-79, P. Block 1).
R (3)Close thrust reverser and the right fan cowl door (Ref. 71-13-00,
R P. Block 301). Remove safety clips and tags and close circuit breakers.

D. Test

R (1)Carry out an engine idle leak check for a minimum of 5 minutes
R (Ref. 71-00-00, P. Block 501).

OIL FILTER DIFFERENTIAL PRESSURE SWITCH - REMOVAL/INSTALLATION

1. General

This procedure provides instructions for removal and installation of the oil filter differential pressure switch.
Access to the oil filter differential pressure switch is through the right fan cowl cool.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B. Material No.C02-023	Anti Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
Referenced Procedures - 71-13-00, P. Block 301	Cowl Doors

3. Procedure

A. Job Set-Up

(1)Open, safety and tag the appropriate circuit breakers and open fan cowl doors (Ref. 71-13-00, P. Block 301).

B. Removal (Ref. Fig. 401)

(1)Disconnect electrical connector from switch and install protective covers.
(2)Place a suitable container under switch, disconnect filter inlet and outlet tubes, allow residual oil to drain.
(3)Remove unions and packings from switch and discard packings.
(4)Remove bolts and washers attaching switch to bracket on oil scavenge filter and remove switch.
(5)Install protective covers on tubes and switch.

C. Installation (Ref. Fig. 401)

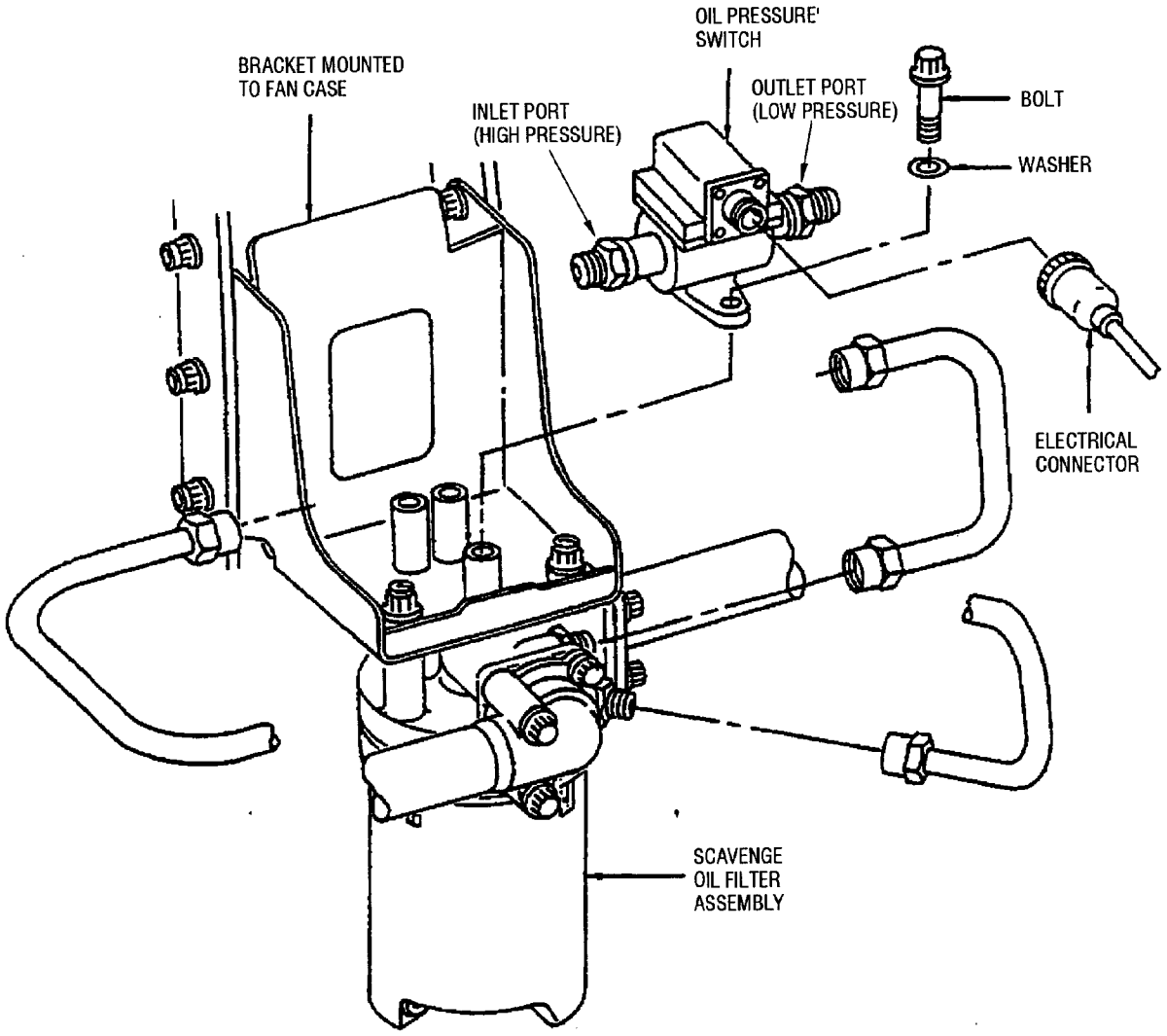
CAUTION : THE OIL FILTER DIFFERENTIAL PRESSURE SWITCH RESEMBLES THE OIL LOW PRESSURE SWITCH. INSTALLATION OF THE INCORRECT SWITCH COULD CAUSE ENGINE DAMAGE.

(1)Install oil filter differential pressure switch as follows :
(a)Remove protective covers from tubes and switch.
(b)Install switch on oil filter bracket with bolts and washers. TORQUE bolts to between 24 and 27 lbf.in. (0.27 and 0.31 m.daN).
(c)Lubricate new packings with engine oil (C02-023) and install packings on unions and unions in switch. TORQUE unions to between 135 and 155 lbf.in. (1.53 and 1.75 m.daN).
(d)Connect filter inlet and outlet tubes to switch and TORQUE tube couplings to between 270 and 300 lbf.in. (3.05 and 3.39 m.daN).
(e)Remove protective covers and connect electrical connector to switch. Tighten connector fingertight plus one-eighth turn.

D. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2)Remove safety clips and tags and close circuit breakers and close fan cowl doors (Ref. 71-13-00, P. Block 301).



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Oil Filter Differential Pressure Switch
Figure 401